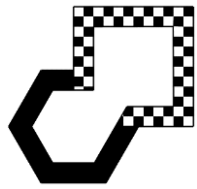
BOOK 1

FILLOMINO LOGIC PUZZLES



MOИTEVEЯDI

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INTRODUCTION

Hello dear friends! Please allow us to briefly introduce ourselves and our book. We are a small group of individuals with a common interest in mathematical and logical puzzles. We have only recently known of the diverse nature of mathematical and logical puzzles, in part because of the excellent puzzle books published by the Japanese Puzzle Company **NIKOLI**. We have been amazed and impressed by the puzzles that we have come across because most of them, albeit having simple rules, will really test your analytical thinking and problem solving skills.

Because we were amazed and impressed with the puzzles we have come across, we decided that we could probably try forming a group and publish our own puzzles too. We decided that our collective name would be **MONTEVERDI**, after a famous racing horse. Next, we decided that we would be making **FILLOMINO PUZZLES** for our first book.

Based on the information that we have, we have found out that **FILLOMINO** was first published in 1994 by **NIKOLI** in **QUARTERLY COMMUNICATION 47**. The original author of the style (apparently) goes by the name of "Suranta". Basically, **FILLOMINO** is about splitting a grid into polyominoes under certain rules.

Here in this book, we have constructed our own **FILLOMINO PUZZLES**. Some of our goals why we made this book are as follows:

- To showcase our work to the mathematical and logical puzzles community
- To provide an additional resource material for those interested in puzzles and for those interested in studying polyominoes
- To hopefully inspire fellow puzzle enthusiasts to try to create their own puzzles too

These are some of the reasons why we made this book, and we really appreciate that you purchased it. We hope that you will have lots of fun solving the original **FILLOMINO PUZZLES** we have made.

Arlan Christopher I. Rodrigo

MONTEVERDI

★ ACKNOWLEDGEMENTS

This book would not have been possible if not for the influence of certain individuals, the exemplary work of some of our members, and the efforts of certain entities to make advancements in the book creation process. Hence, we would like to take this opportunity to give due acknowledgement to them.

We would like to thank the members of the active mathematical and logical puzzles community for influencing us and encouraging us to make our own puzzles. Most importantly, we would like to thank the many prolific puzzle creators (like **Thomas Snyder**) for their continued contribution and inspiration they give to others. We also want to pay homage to the works published by the legendary puzzle creator **Samuel Loyd** and recreational mathematics populariser **Martin Gardner**. We would also like to acknowledge **Professor Solomon W. Golomb**. His book, **Polyominoes: Puzzles, Patterns, Problems, and Packings** is a great resource material on polyominoes.

We, **MONTEVERDI**, would also like to acknowledge the exemplary efforts of certain members in our group for making this book possible. **Mr. Arlan Christopher I. Rodrigo** is the overall project leader and main contributor. **Miss Kang Jaeyeon** made valuable contributions to the overall design of the book and the design of some puzzles. **Sir Vladimir Bierko** was in-charge of gathering relevant resource materials about puzzles.

Finally, we want to thank some entities or companies for helping us make a "modern book". We hereby acknowledge and give due credit to technology companies like **Google LLC** and **Microsoft Corporation** for making valuable advancements in the book creation process. We want to thank them for making products that are of great utility to book authors. These includes fonts, glyphs, symbols, icons, and emojis that can be conveniently incorporated in the books of this modern age to enhance readability.

? FILLOMINO RULES

The standard **FILLOMINO PUZZLE** is played on a rectangular grid which is made up of individual unit square cells. At the beginning of a **FILLOMINO PUZZLE**, some cells will have numbers in them. These are the clues to the puzzle. **FIGURE 1** shows a **FILLOMINO PUZZLE** in its initial state. Notice that there are five (5) clues to this puzzle. The clues are written in cells **B1**, **D1**, **A2**, **C2**, and **C4**.

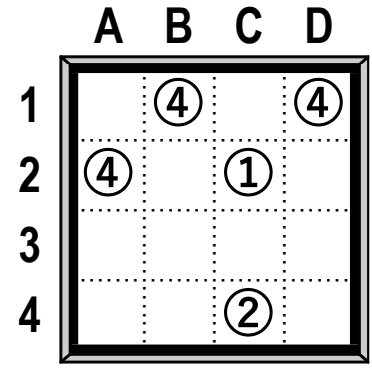


FIGURE 1

Important Note: The clues in this book are in the form of circled numbers. The purpose is functional and does not affect how the puzzles are solved. The clues are circled so that if you want to erase some of your work while solving a puzzle, you will know beforehand that circled numbers should not be erased. In addition to this, after you have solved a puzzle, the initial state of the puzzle can still be distinguished and easily recovered because of the circled clues.

By writing a positive whole number in each blank cell, you can make a **completed grid**. Given **FIGURE 1**, **FIGURE 2** and **FIGURE 3** are examples of completed grids.

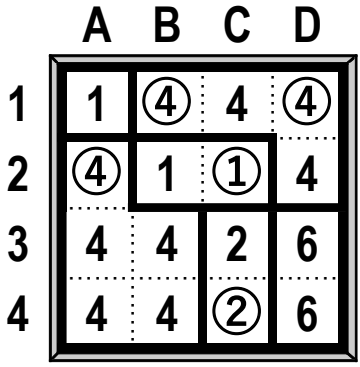


FIGURE 2

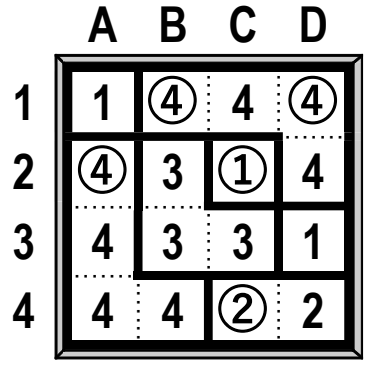


FIGURE 3

All cells in the grid follow these two (2) connection rules:

❶ **Trivial Connection Rule:** Let cell **A** be any cell on the grid. Then **cell A is connected to itself (cell A)**. This is written as **A✦A**.

❷ **General Connection Rule:** Let cell **A** and cell **B** be different cells. Then **A is connected to B** (written as **A✦B**) **if and only if there exists a sequence S composed of distinct cells** that starts with **A** and ends with **B** with the property that for any two (2) consecutive cells on the sequence, those cells are adjacent to each other either horizontally or vertically and they contain the same number.

Let us give some examples. In **FIGURE 2**, **A1✦A1** because of ❶. In **FIGURE 2**, **A2✦B4** because there is a sequence **S** with the required property stated in ❷. **S** can be defined as **S: {A2, A3, B3, B4}**. **S** could also have been defined as **S: {A2, A3, A4, B4}**. On the other hand, defining **S** as **S: {A2, B2, B3, A3, A3, B4}** would NOT be correct because of several reasons such as: 1.) Consecutive cells **A2** and **B2** are adjacent to each other horizontally but they contain different numbers., 2.) A cell appears more than once in the sequence (**A3**)., 3.) Consecutive cells **A3** and **B4** are not adjacent to each other either horizontally or vertically.

Note that in ❷, if it can be concluded that **A✦B**, then **B✦A** also. If two (different) cells **A** and **B** are determined to be connected by ❷, then we say that "A path from cell **A** to cell **B** exists."

The **solution set** to a **FILLOMINO PUZZLE** is the set of completed grids that have the property that if a certain cell **A** on the grid contains a certain number **N**, then that cell must be connected to exactly **N** cells on the grid.

Let us take a look at **FIGURE 2**. It is NOT a solution to the **FILLOMINO PUZZLE** shown in **FIGURE 1**. Here are some reasons why it is NOT a solution to the puzzle:

- **C2** contains a **1**. However, it is connected to two (2) cells. **C2✦C2** because of ❶. Also, **C2✦B2** because of **S: {C2, B2}**.
- **D4** contains a **6**. However, it is connected to only two (2) cells, **D4** and **D3**.
- **A2** contains a **4**. However, it is connected to five (5) cells. It is connected to **A2**, **A3**, **A4**, **B3**, and **B4**.

FIGURE 3 is a solution to **FIGURE 1**. In fact, it is the ONLY solution to the puzzle. A more detailed explanation as to how **FIGURE 3** was obtained is given in the **GUIDED EXAMPLES** section. For now, let us verify that **FIGURE 3** is indeed a solution to the puzzle:

- Cells **A1**, **C2**, and **D3** all contain a **1**. Each is connected only to itself.
- **A2**, **A3**, **A4**, and **B4** all contain a **4**. **A2✦A2** by ❶. **A2✦A3** because of **S: {A2, A3}**. **A2✦A4** because of **S: {A2, A3, A4}**. **A2✦B4** because of **S: {A2, A3, A4, B4}**. **A2** is connected to a total of four (4) cells (**A2**, **A3**, **A4**, **B4**). Each of **A3**, **A4**, and **B4** is also connected to exactly four (4) cells.
- **B1**, **C1**, **D1**, and **D2** all contain a **4**. It is easy enough to verify that each is indeed connected to exactly four (4) cells.

- **C4** and **D4** both contain a **2**. **C4** is connected to exactly two (2) cells, namely **C4** and **D4**. **D4** is also connected to exactly two (2) cells.
- **B2**, **B3**, and **C3** all contain a **3**. Each is connected to exactly three (3) cells.

In this book, all puzzles have a unique solution. However, even if this is so, part of your task as a puzzle solver is to **NEVER** assume that at the beginning of a puzzle, only one solution will exist. Rather, the correct approach is to use logical reasoning to find all possible solutions to a given puzzle with the rules in consideration. By doing so, and having found only one solution to the puzzle in the end, be fully convinced that there is indeed only one solution to the puzzle. This is the way!

In a solution to a **FILLOMINO PUZZLE**, if a cell **A** contains **N**, then cell **A** is said to be a part of a polyomino of size **N**, or that cell **A** is a part of an **N – CELL**. **Roughly speaking, an N – CELL is a set of N squares on the grid that are connected to each other. The connected cells will ALL contain the same number N. Also, the cells on its "border" will NOT contain N.**

FIGURE 4 illustrates an impossible **4 – CELL** since the cell containing a **2** is not connected to the other cells. **FIGURE 5** shows a possible **4 – CELL** that can be found in a solution to a **FILLOMINO PUZZLE**. All connected cells contain a **4** and the **border cells** (marked by ✕) are ALL not equal to **4**.

FIGURE 4

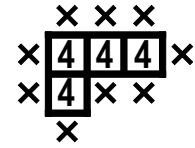


FIGURE 5

Consider again the **FILLOMINO PUZZLE** in **FIGURE 1** and its solution given by **FIGURE 3**. We can see clearly from this example the main essence and goal of solving a **FILLOMINO PUZZLE** — given a set of clues, the goal is to fill the grid with the appropriate polyominoes. **FIGURE 7** gives a clearer picture of the polyominoes that **FIGURE 3** (given below as **FIGURE 6**) can be broken into.

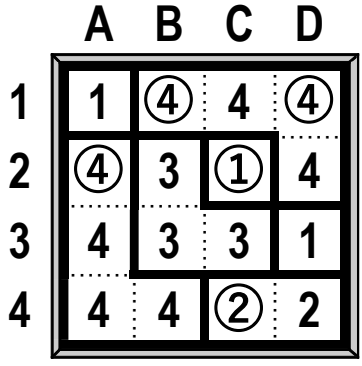


FIGURE 6

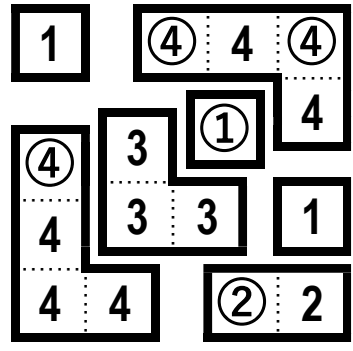


FIGURE 7

Looking at **FIGURE 7**, we see that **A2** is part of a **4 – CELL** (which looks like the one shown in **FIGURE 8**). **B1** is part of a different **4 – CELL** (which looks like the one shown in **FIGURE 9**).

FIGURE 8

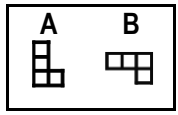
FIGURE 9

FIGURE 10

From a certain vantage point, **FIGURE 8** and **FIGURE 9** look like the same polyomino. On the other hand, **FIGURE 8** and **FIGURE 10** do not look like they are the same polyomino, even though they are both polyominoes of size **4**. **FIGURE 8** and **FIGURE 9** are indeed the same **FREE POLYOMINO** which we will define next.

FREE POLYOMINO: Two polyominoes are the same **FREE POLYOMINO** if one of them can be obtained from the other by a sequence of translations, rotations, reflections, and/or glide reflections.

FIGURE 11 explains why **FIGURE 8** (polyomino **A**) and **FIGURE 9** (polyomino **B**) are the same **FREE POLYOMINO**.

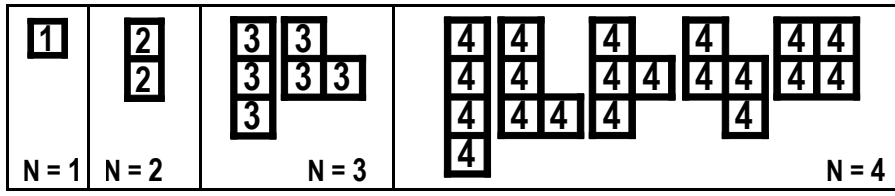


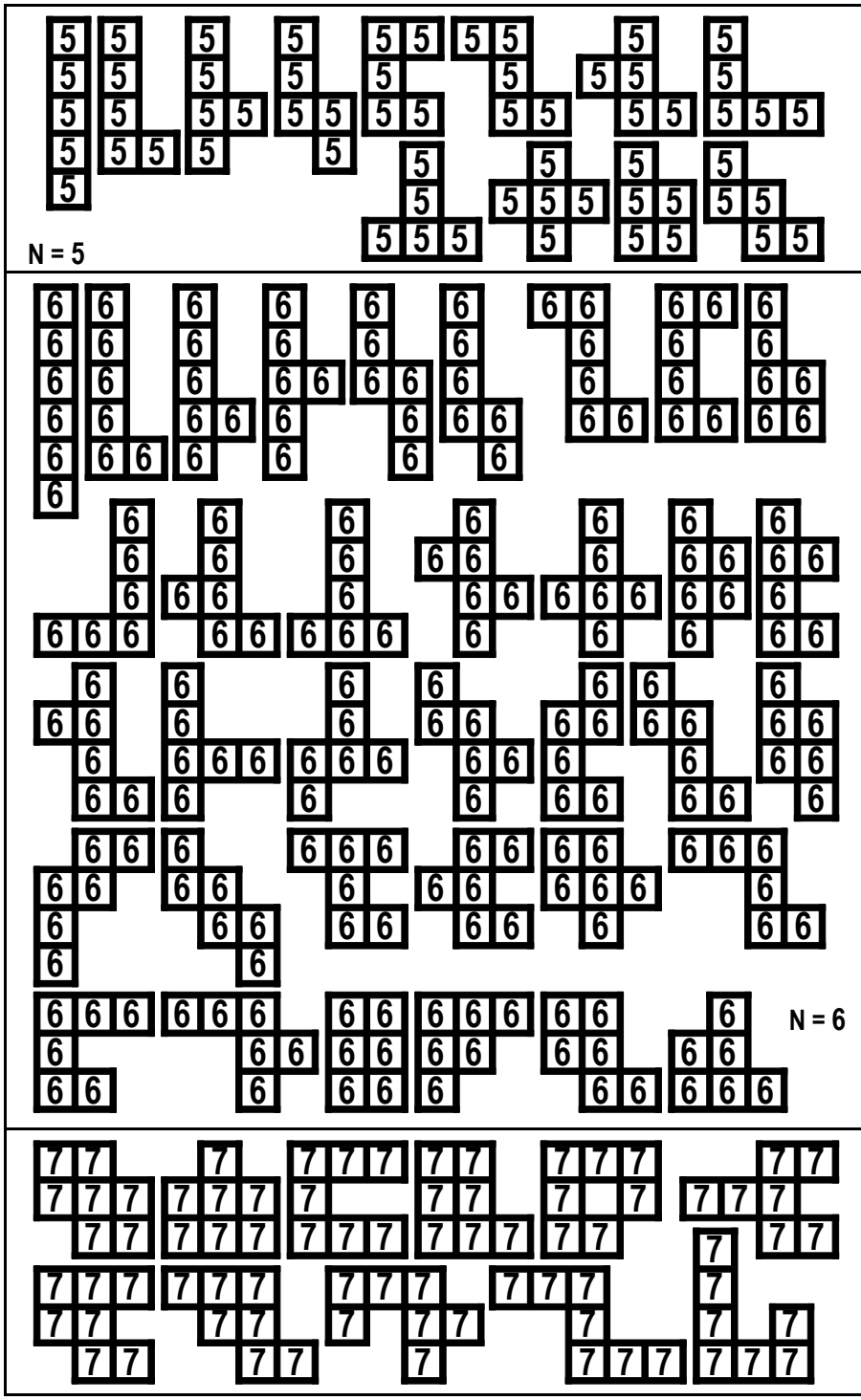
A to **B**: 1.) Make a 90° clockwise rotation 2.) Make a horizontal flip

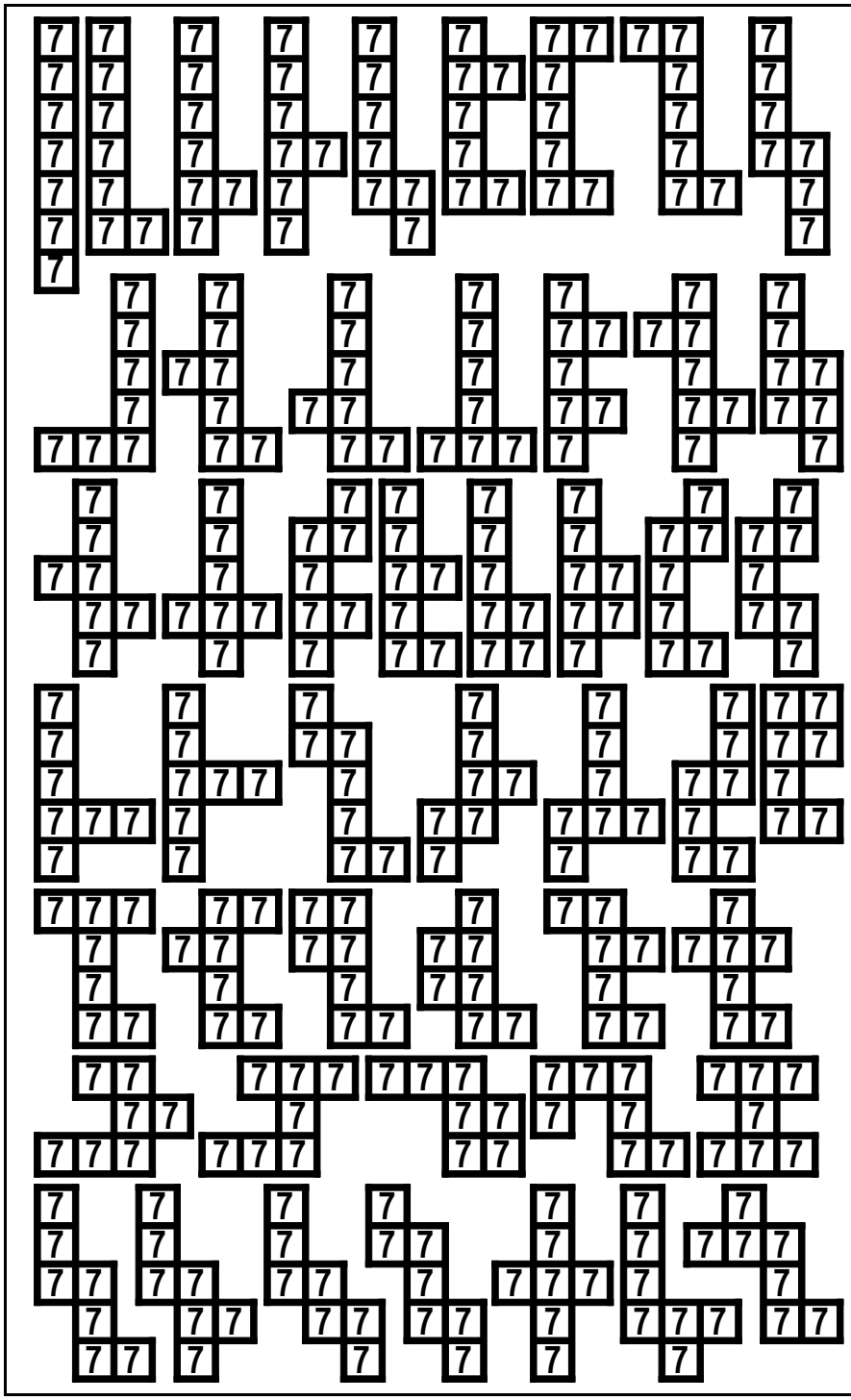
FIGURE 11

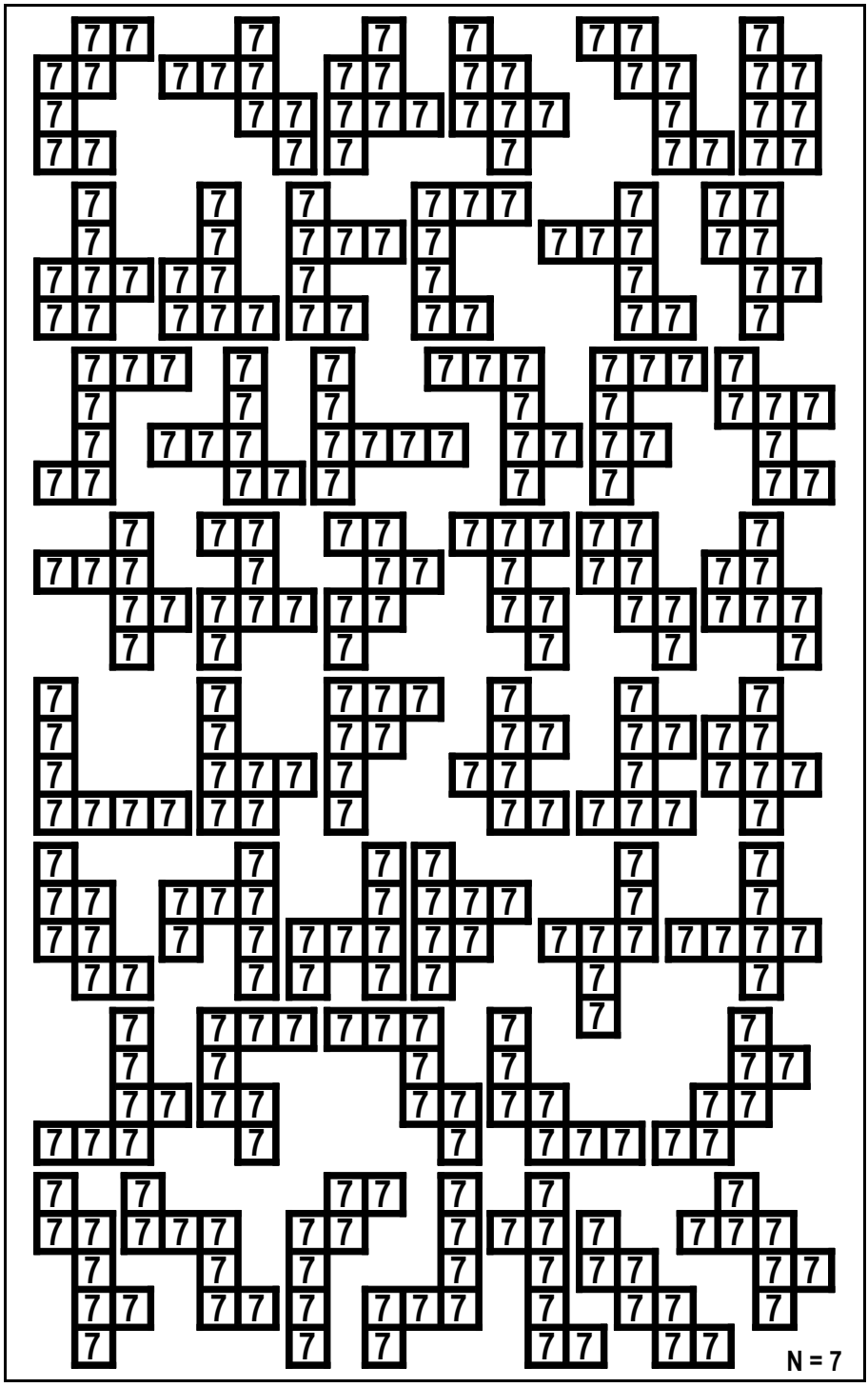
The next table gives the number of **FREE POLYOMINOES** for each polyomino of size **N**, where **N ≤ 7**. After that, ALL **FREE POLYOMINOES** of size **N ≤ 7** are enumerated.

N - CELL	COMMON NAME	NUMBER OF FREE POLYOMINOES
1 - CELL	monomino	1
2 - CELL	domino	1
3 - CELL	triomino	2
4 - CELL	tetromino	5
5 - CELL	pentomino	12
6 - CELL	hexomino	35
7 - CELL	heptomino	108




N = 5
N = 6




N = 7

GUIDED EXAMPLES

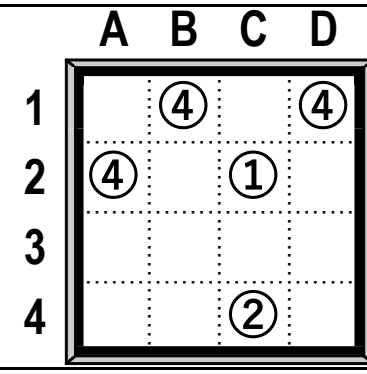
In this part, you will be guided in solving some **FILLOMINO PUZZLES**. You will learn some "tricks" along the way that will help you solve the puzzles. ❶ and ❷ will always mean the connection rules as stated in the **FILLOMINO RULES** section.

Before we begin, always remember that in solving **FILLOMINO PUZZLES**, we are basically trying to make completed grids with the property that if a certain cell **A** on the grid contains a certain number **N**, then that cell must be connected to exactly **N** cells on the grid.

EXAMPLE NO. 1

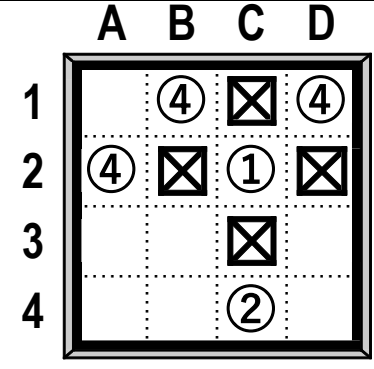
Meg

Hello! Are you ready to try out a **FILLOMINO PUZZLE**? Let us try this one.



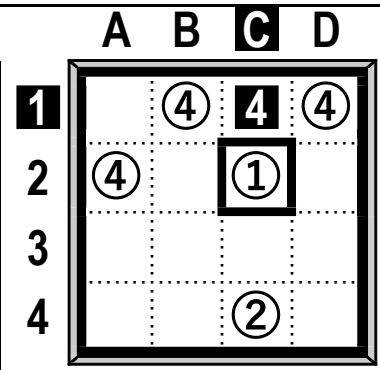
Meg

The total number of cells that **C2** must be connected to should be one (1) since it contains a **1**. Already, we know that **C2✦C2** because of ❶. If a certain cell **A** in ☒ is a **1**, then **C2✦A** by letting **S: {C2, A}** in ❷. And if that happens, **C2** will then be connected to more than one (1) cell, and this is NOT what we want for **C2**. Therefore, it must be that ☒ ≠ **1**.



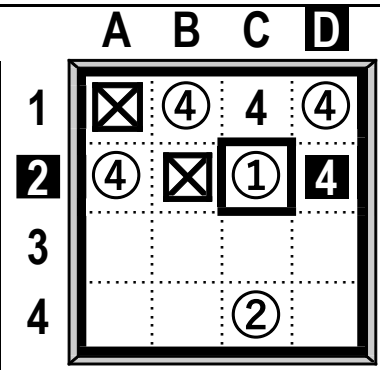
Meg

If **C1 = 2**, then obviously you cannot fit a **2 – CELL** domino because it is surrounded by either a **4** or a **1** horizontally and vertically. And also **C1 ≠ 1** as we mentioned because directly below it, there is a **1**. The only possible number to place in **C1** is a **4**, and **C1** will be connected to **B1** and **D1** because of ❷. **C1 = 4**.



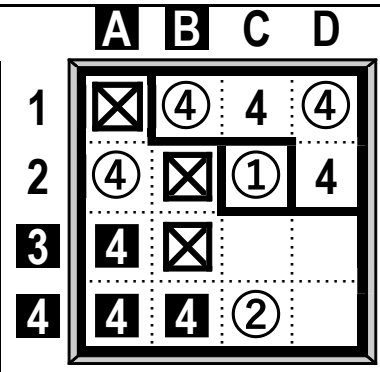
Meg

C1✦C1, **C1✦B1**, and **C1✦D1**. **C1** needs to be connected to exactly one more cell. That cell is either **A1**, **B2**, or **D2**. If **A1 = 4** or if **B2 = 4**, then **C1** will also be connected to **A2** since **A2** contains a **4**. (For example, if **B2 = 4**, **C1✦B2** and **C1✦A2**.) **C1** will then be connected to more than four (4) cells, and this is NOT what we want for **C1**. Hence, ☒ **≠ 4** and **D2 = 4**.



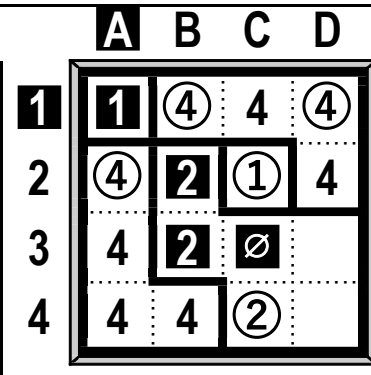
Meg

A2✦A2. **A2** must be connected to three (3) other cells. Because **A1 ≠ 4** and **B2 ≠ 4**, **A3 = 4**. Next, if **B3 = 4**, there is no number that can be placed in **B2**. (**B2** could not be a **1** or a **4**. If **B2 = 2**, **3**, **5**, or any other number, the intended polyomino cannot be completed.) Since **B3 ≠ 4**, we now know how to complete the tetromino for **A2**. ☒ **≠ 4**. Therefore, it must be that **A4 = 4** and **B4 = 4**.



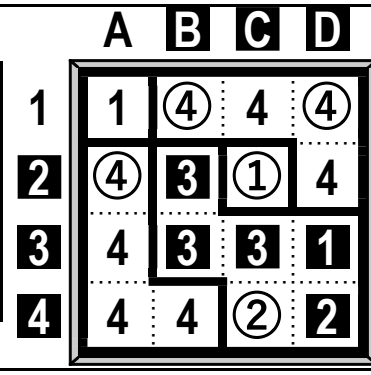
Meg

A1 must be a **1**. **A1 = 1**. **B2** cannot be **5** or more since there will not be enough cells in the grid. (If **B2 = 5**, all remaining blank cells would have to be a **5**. But if that happens, then the domino with which **C4** is a part of cannot be completed.) So, **B2 = 2** or **B2 = 3** are the only possibilities now for cell **B2**. If **B2 = 2**, then **B3 = 2** also. But now, **C3** cannot be **1** or **2**. **C3** also cannot be **3** or more. Hence, **B2 ≠ 2**.



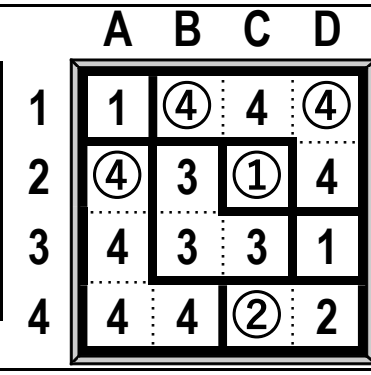
Meg

Let us finish the puzzle. **B2 = 3**. After that, there is only one way to complete this triomino. **B3 = 3**. **C3 = 3**. **C4** is part of a domino, so complete the domino to the right of **C4**. **D4 = 2**. The last remaining blank cell must be a **1**. **D3 = 1**.



Meg

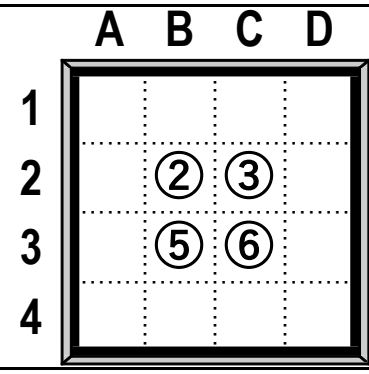
This is the way! Use the techniques that you know and deductive reasoning to solve the puzzles. Do you want another puzzle? In the initial state of the puzzle we have just solved, move the clue in **C2** to **A3**. Now solve this new puzzle.



EXAMPLE NO. 2

Meg

Hello! Are you ready to try another **FILLOMINO PUZZLE**? Let us try this one before I leave you on your own.



Meg

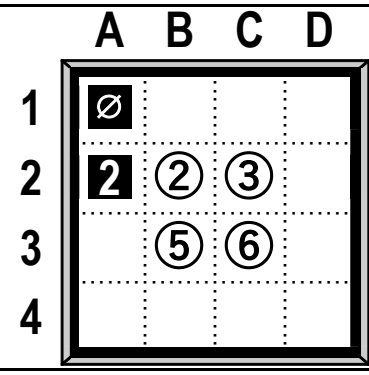
The clues tell us that there is a domino on the grid because of the clue in **B2**. There is also a triomino on the grid, a pentomino, and a hexomino. These polyominoes will occupy a total of 16 cells (2 + 3 + 5 + 6). But there are only 16 cells on the grid! This means that we already know all the polyominoes on the completed grid. This also means that each blank cell must either be a **2**, **3**, **5**, or a **6**.

COMPONENTS OF THE COMPLETED GRID

POLYOMINOES	NO. OF CELLS
domino x 1	2
triomino x 1	3
pentomino x 1	5
hexomino x 1	6
TOTAL	16

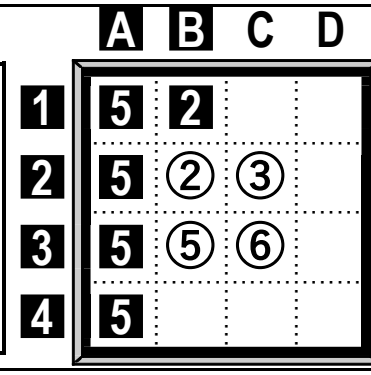
Meg

There are two (2) ways to complete the domino with which **B2** is a part of. Either **A2 = 2** or **B1 = 2**. If **A2 = 2**, then **A1** cannot be a **3**, **5**, or a **6**. (For example, if **A1 = 3**, then **B1** and **C1** must also be a **3**. This is already a contradiction since only three cells can contain a **3**.) Hence, **A2 ≠ 2**.



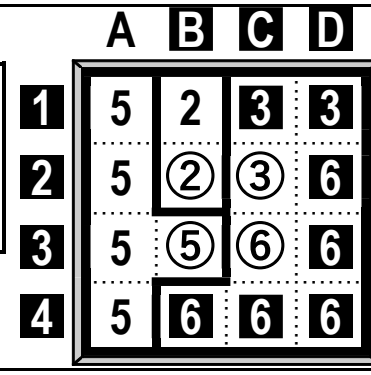
Meg

B1 = 2. Next, notice that **A1** should be a **5** since it is "too far" to create a triomino or hexomino. **A1 = 5**. Now, we need to form a pentomino. **A1** should connect to **B3** so that **A2 = 5** and **A3 = 5**. Next, if **B4 = 5**, then **A4** will be "isolated" and cannot possibly be a **3** or a **6**. Hence, **B4 ≠ 5**. **A4 = 5**.



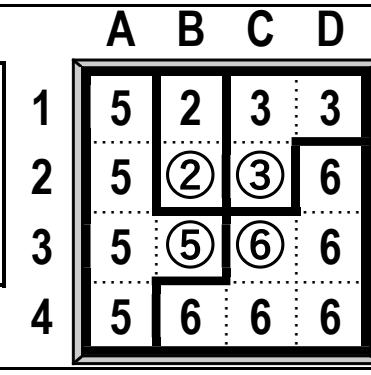
Meg

If **D2 = 3**, then there will not be enough cells to complete the hexomino. Hence, **D2 = 6**. The rest is easy to determine. **B4 = 6**. **C4 = 6**. **D4 = 6**. **D3 = 6**. **C1 = 3**. **D1 = 3**.



Meg

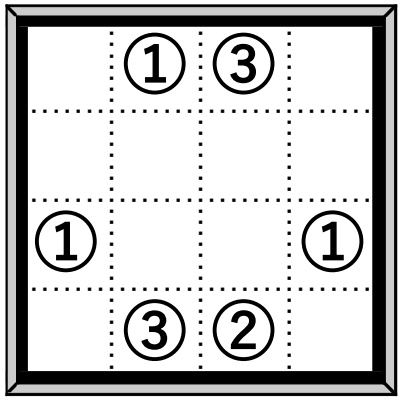
This is the way! This completes our session. I hope you have learned the basic process and some techniques in solving the puzzles. You will now be on your own from now. Have fun solving **FILLOMINO PUZZLES**.



4 x 4 PUZZLES

1 2 3 4 5 6 7 8 9 10
11 12

PUZZLE NO. 1



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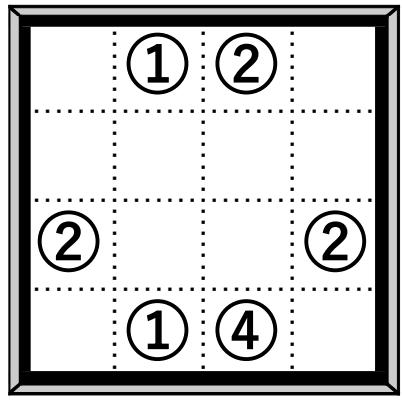

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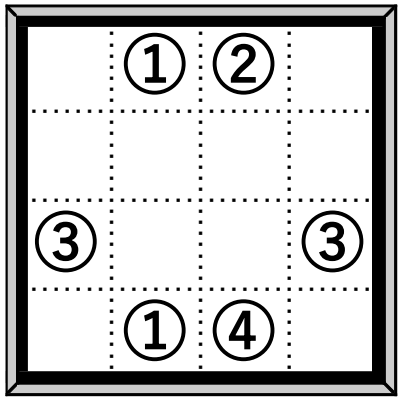

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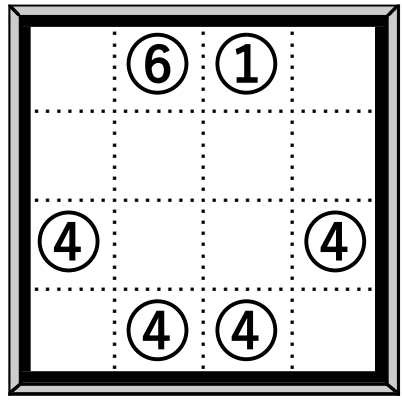

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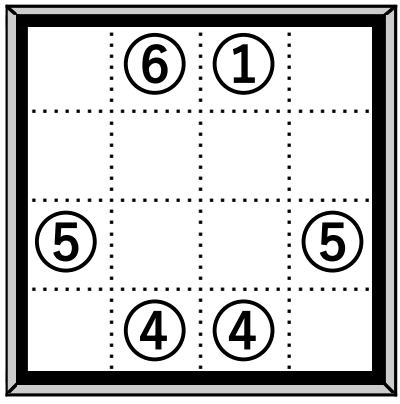

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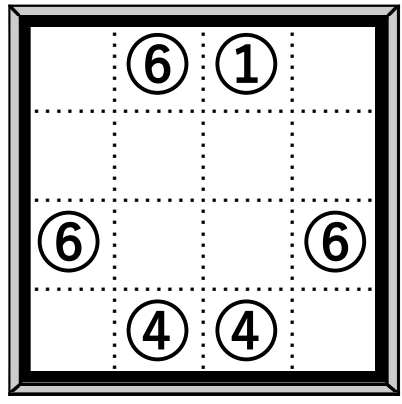

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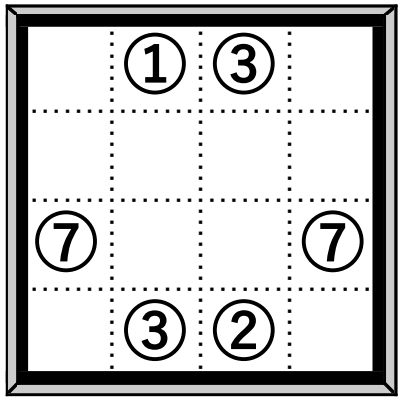

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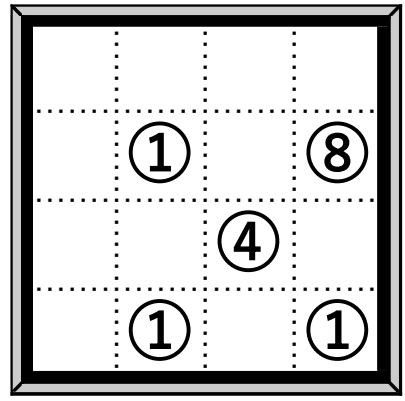

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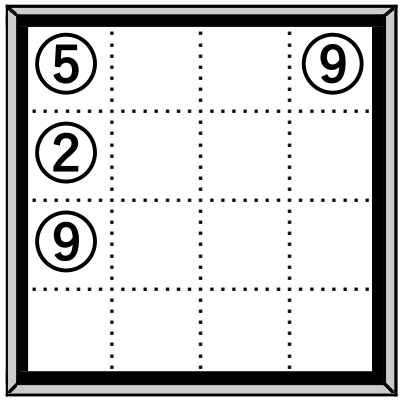

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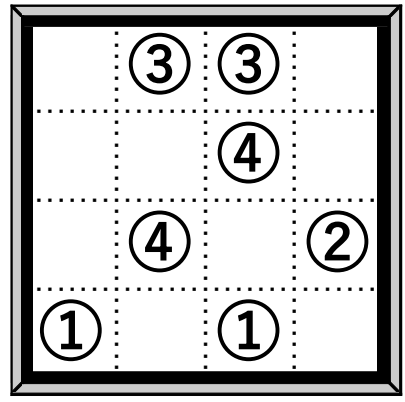

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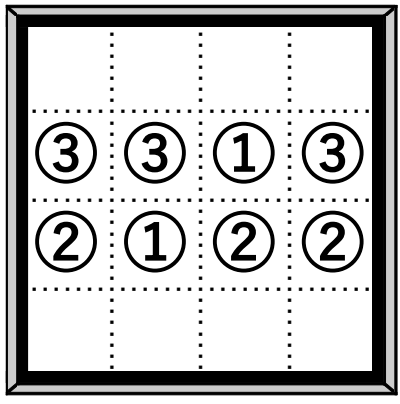

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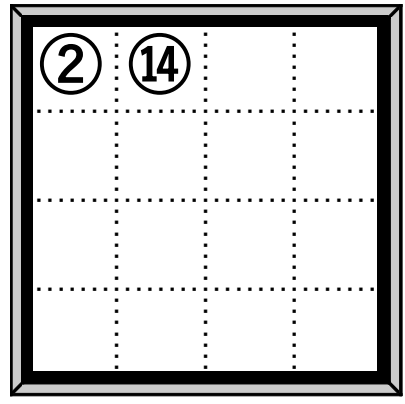
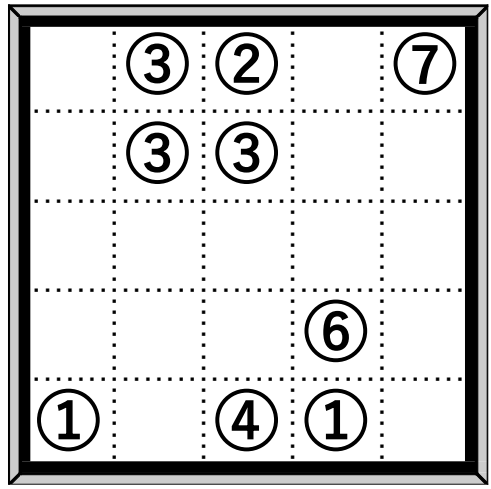


5 x 5 PUZZLES

1 2 3 4 5 6 7 8 9 10
11 12

PUZZLE NO. 1



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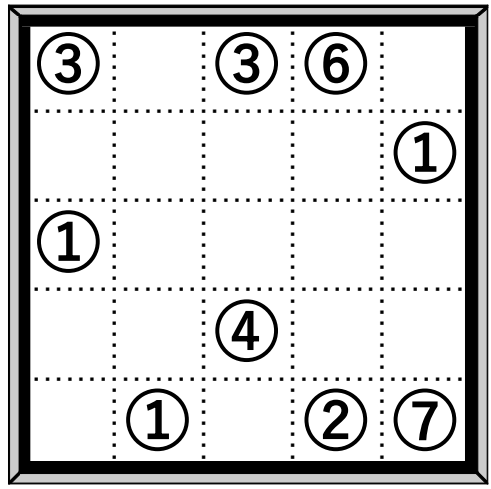

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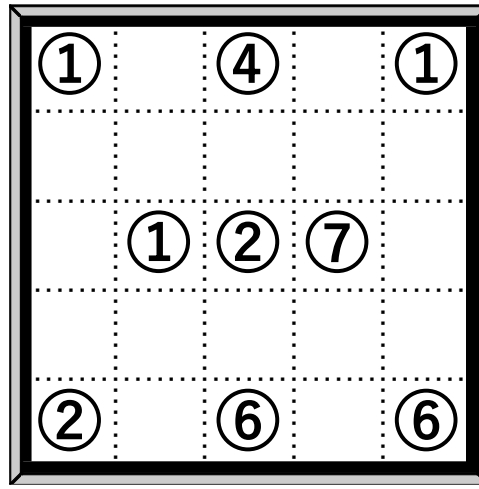

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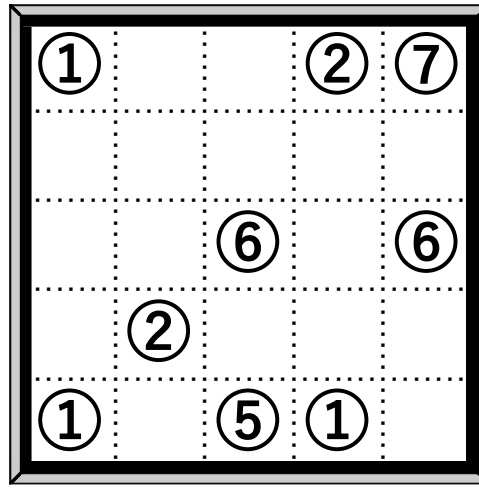

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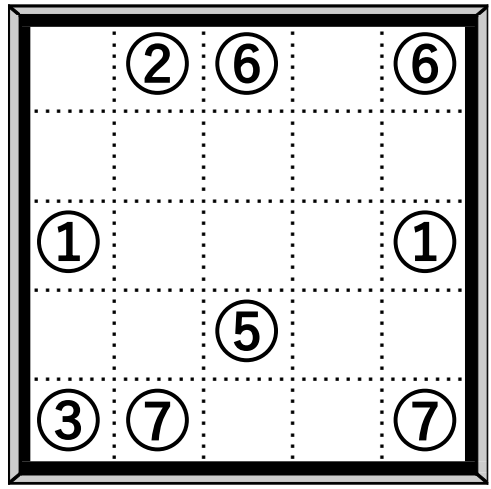

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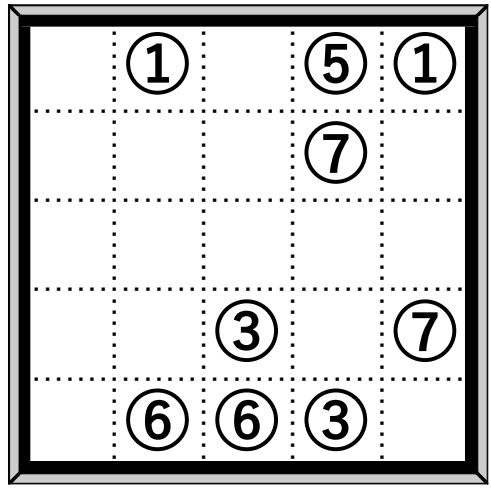

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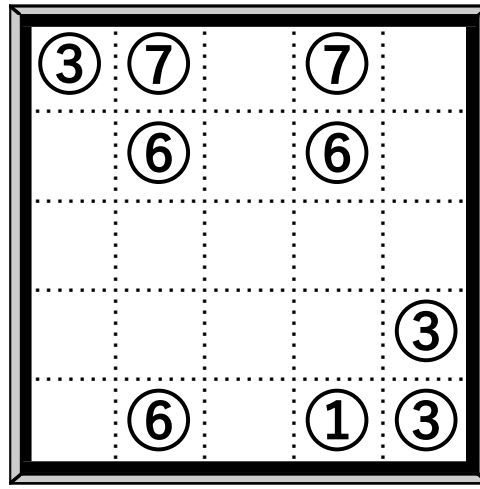

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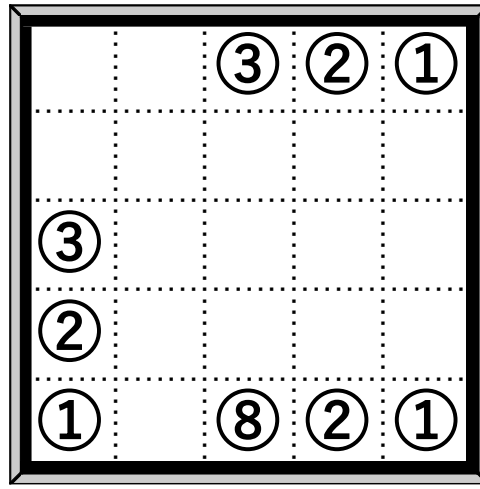

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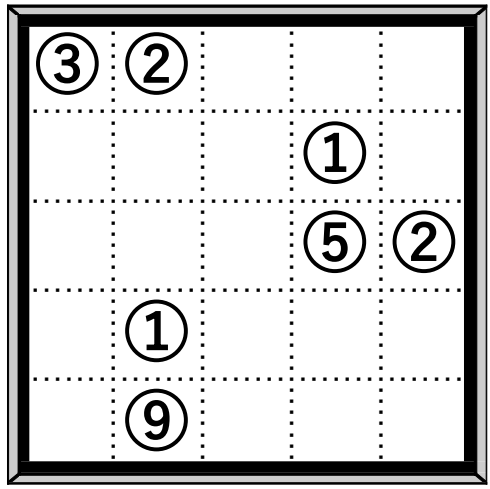

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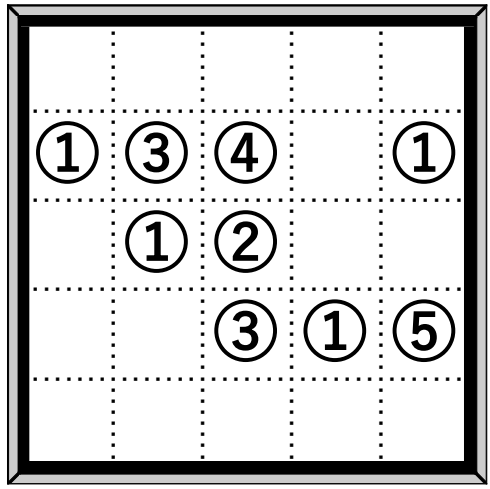
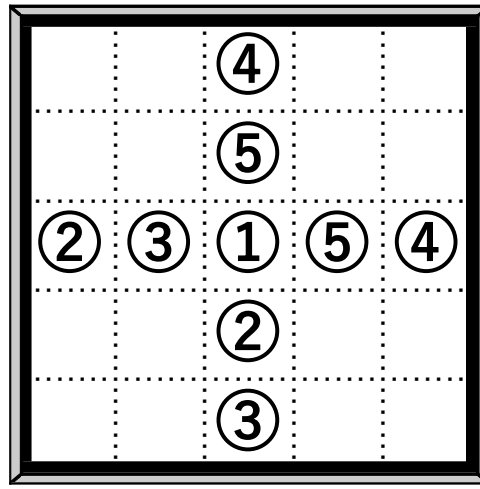


PUZZLE NO. 11



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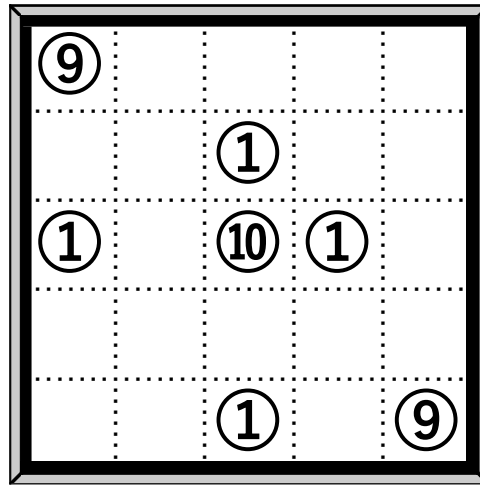
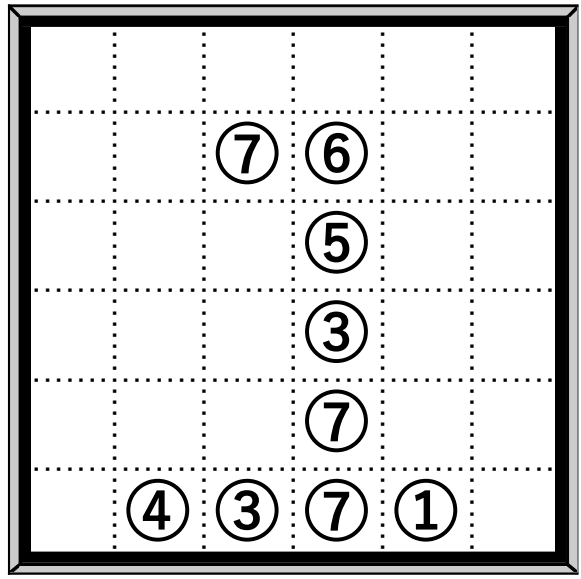


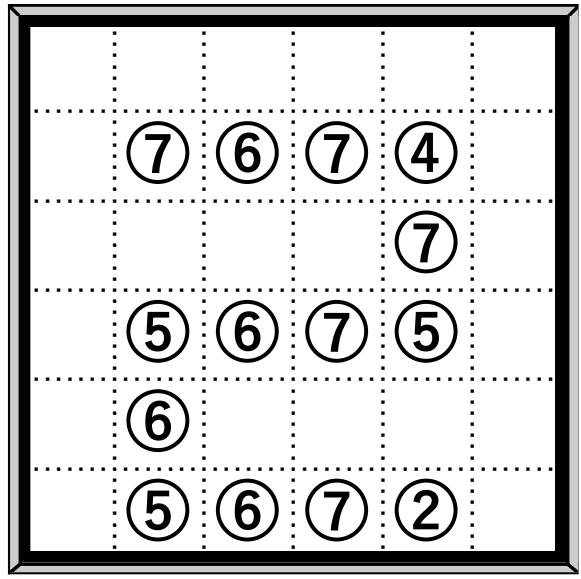
6 x 6 PUZZLES

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52								

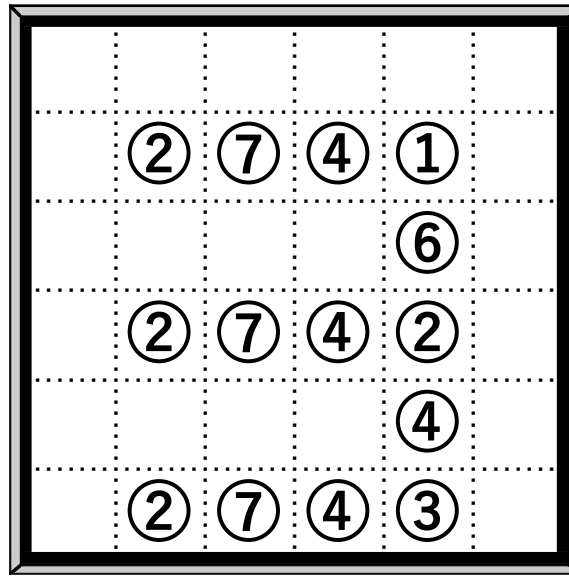
PUZZLE NO. 1



PUZZLE NO. 2



PUZZLE NO. 3



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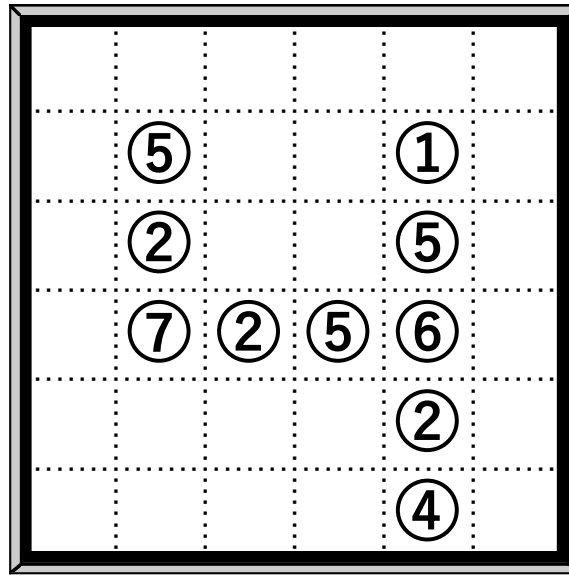

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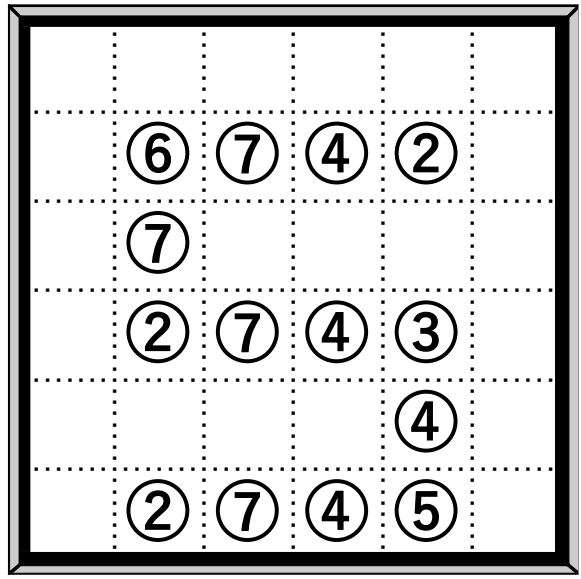

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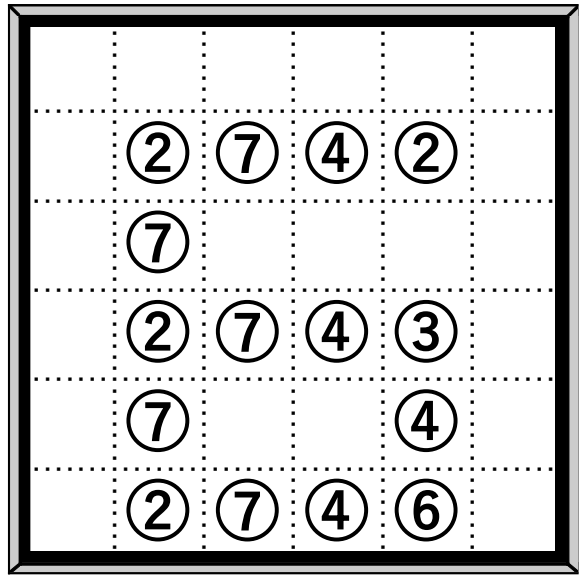

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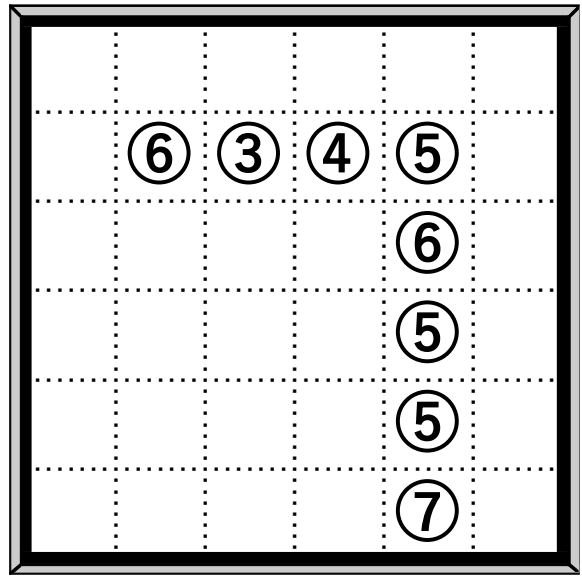

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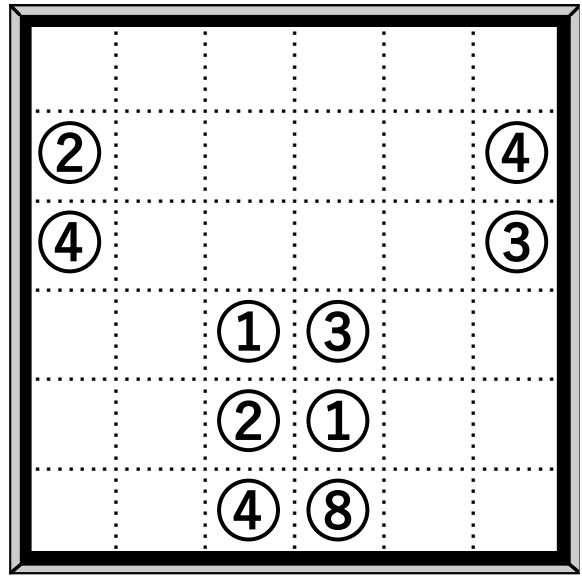

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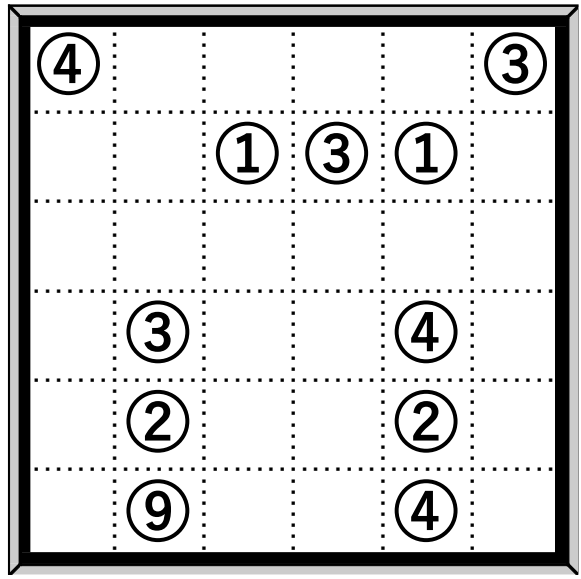
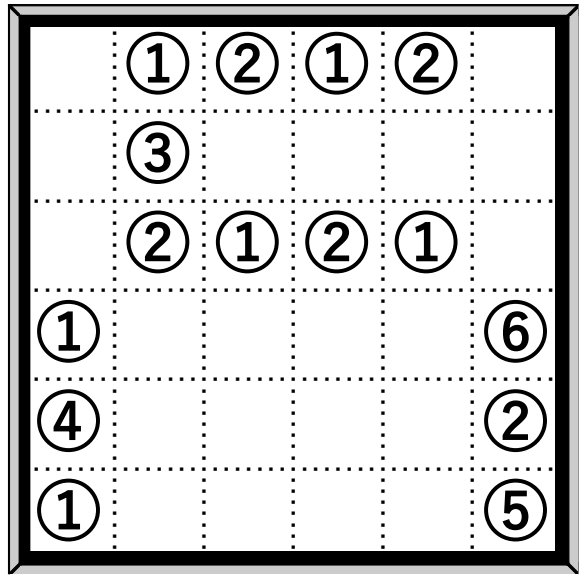
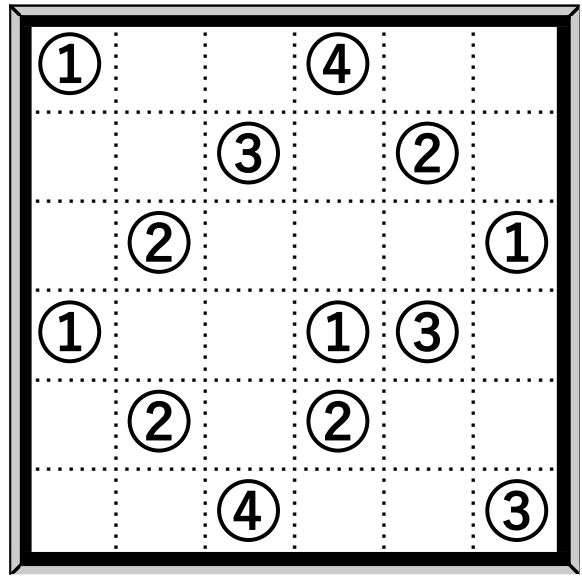


PUZZLE NO. 10



PUZZLE NO. 11



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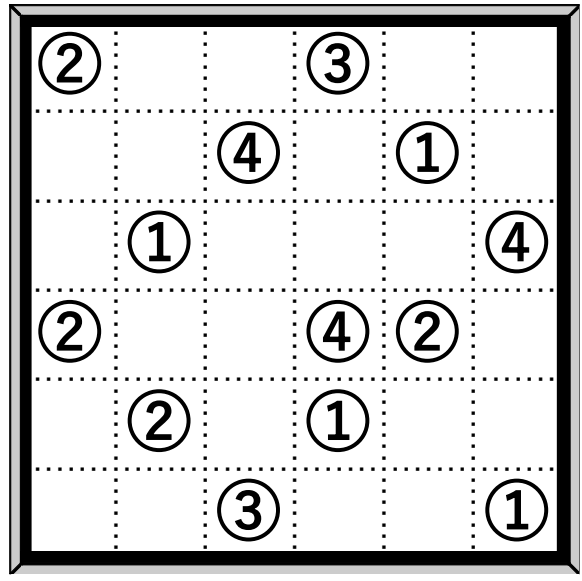

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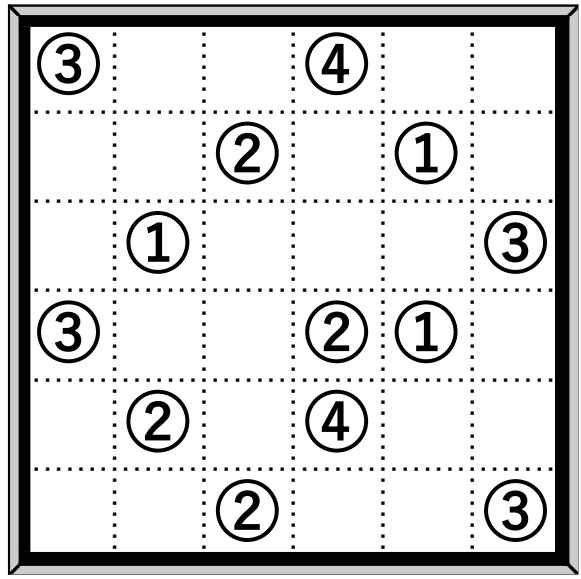

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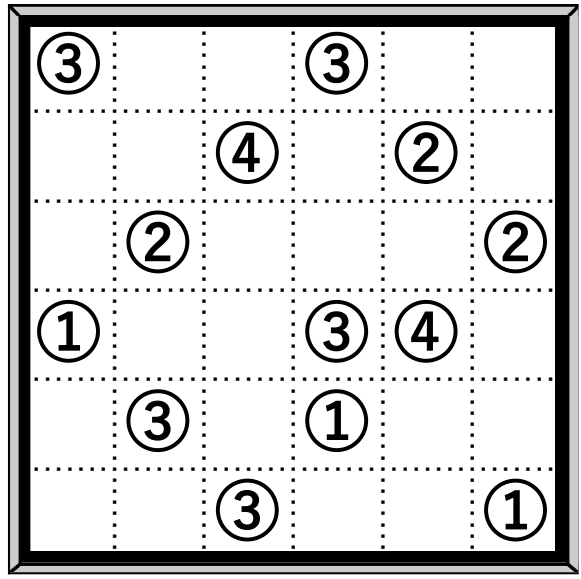

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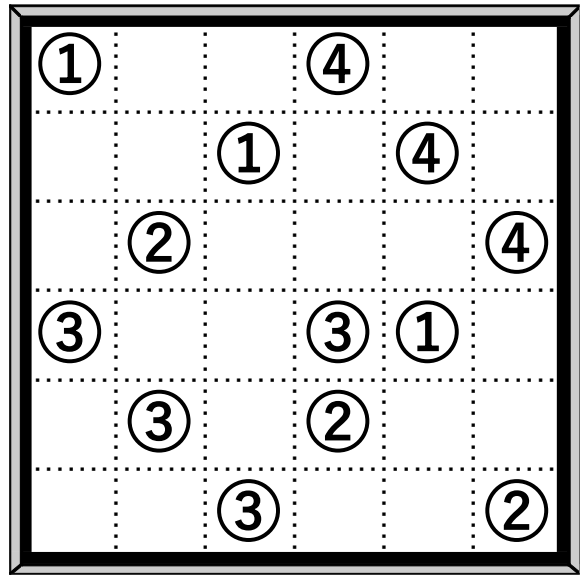

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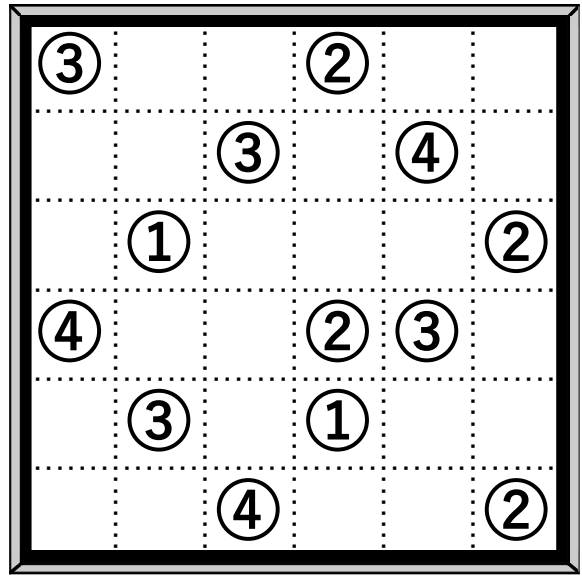

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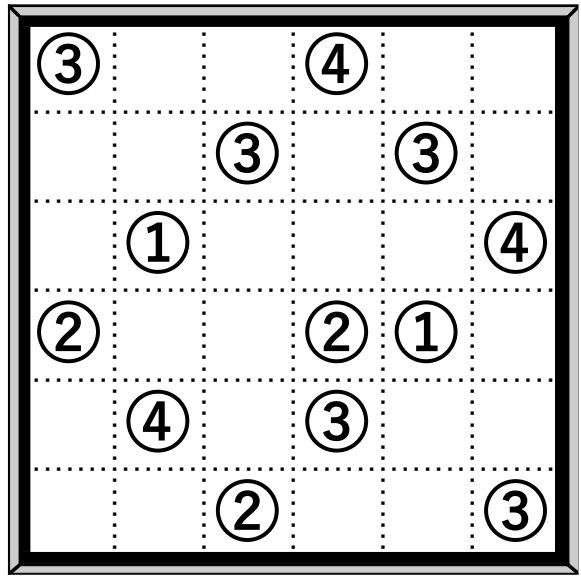
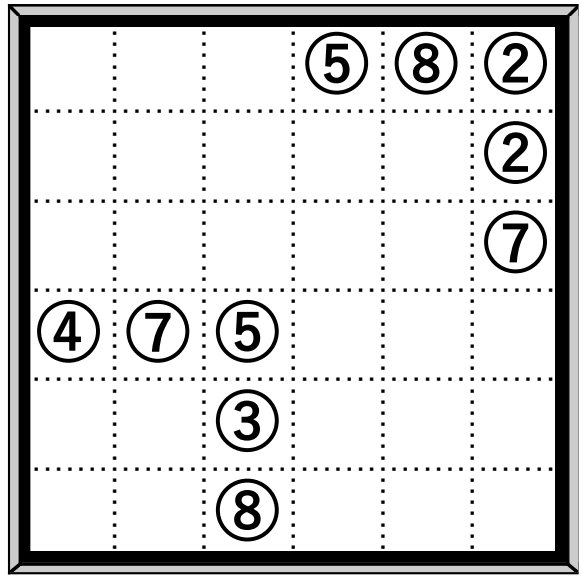


PUZZLE NO. 18



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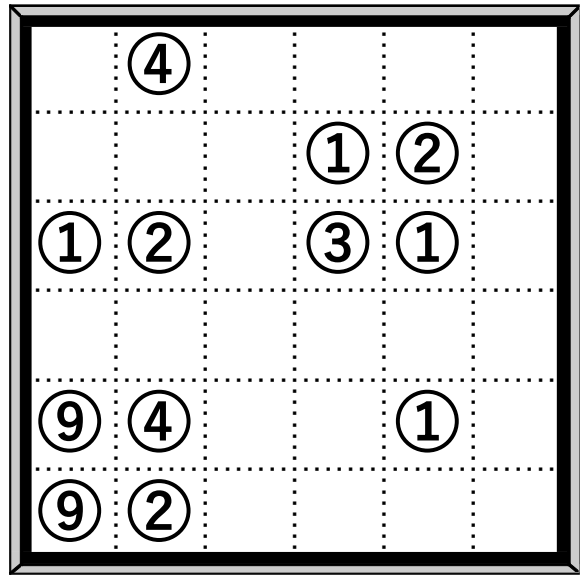
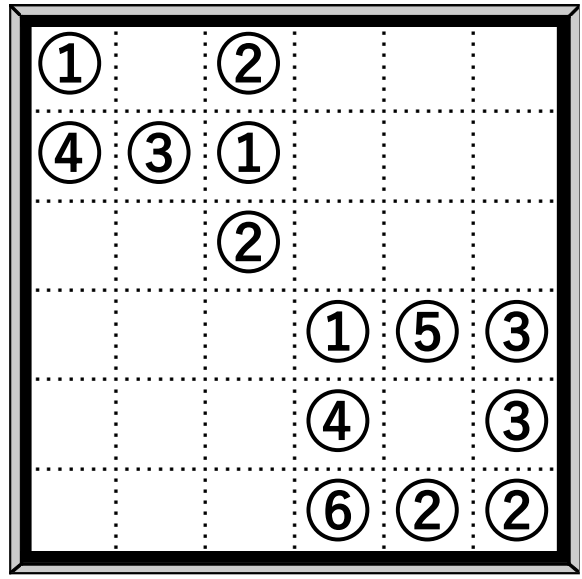
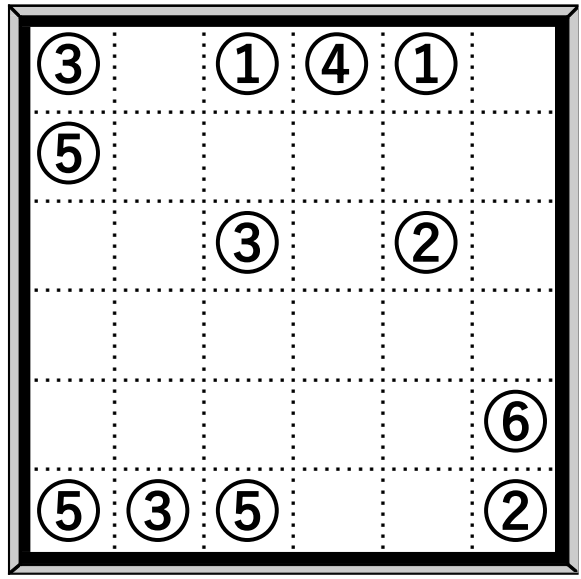


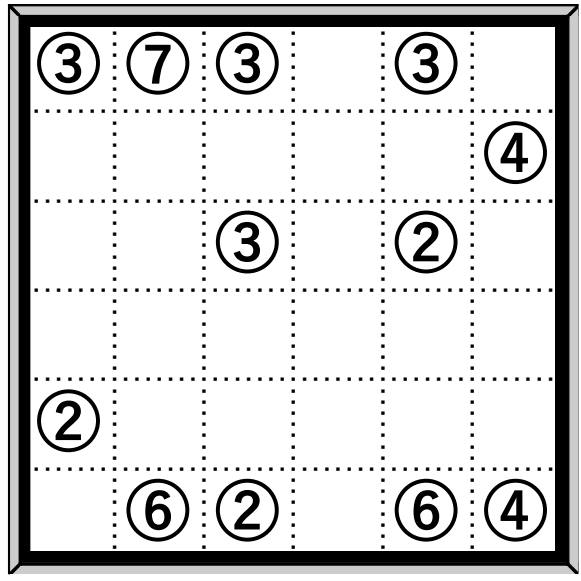
PUZZLE NO. 20



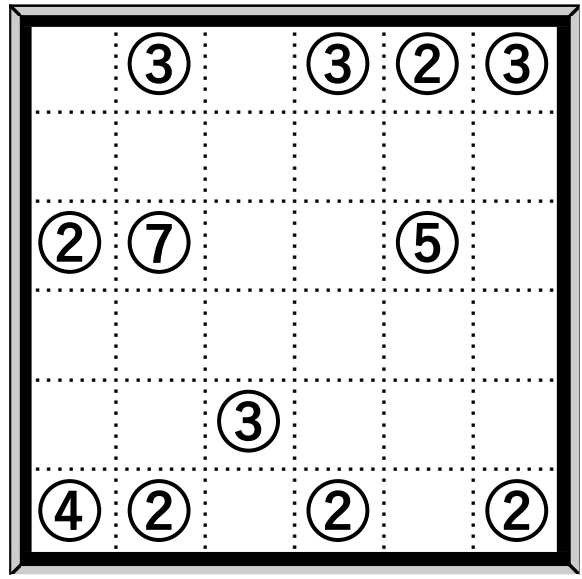
PUZZLE NO. 21



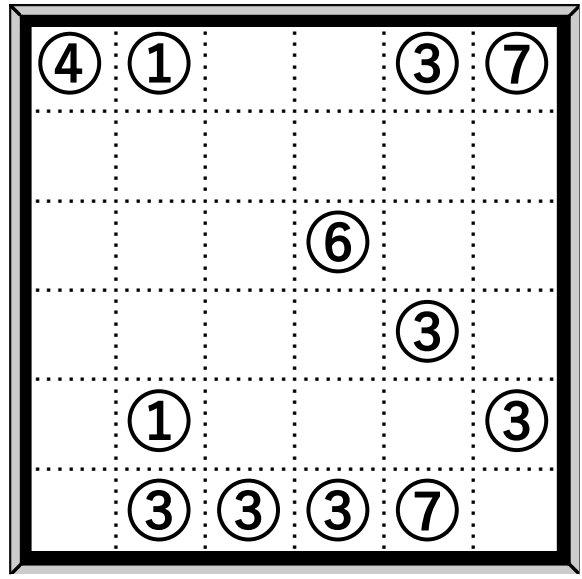
PUZZLE NO. 22



PUZZLE NO. 23



PUZZLE NO. 24



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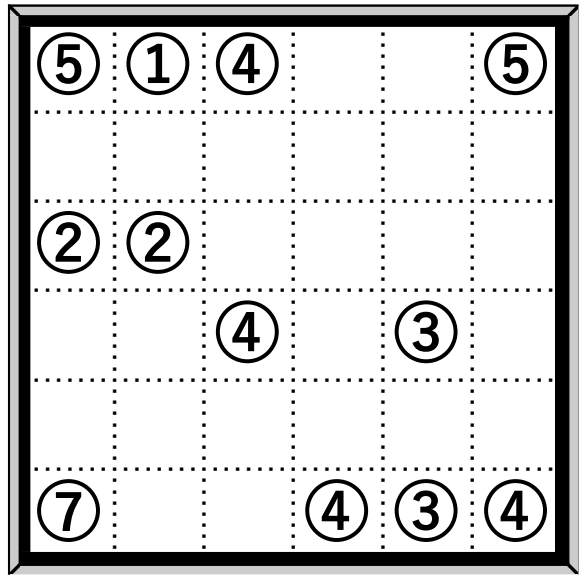

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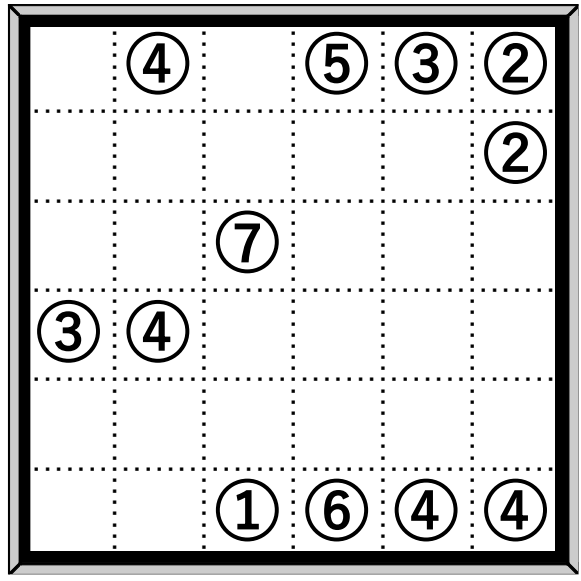

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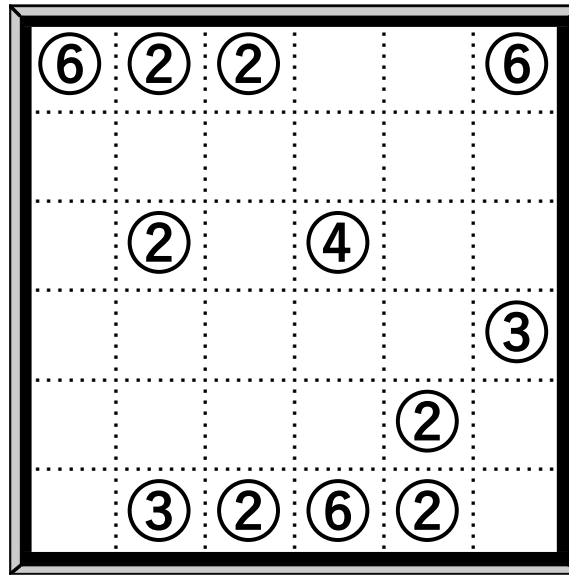

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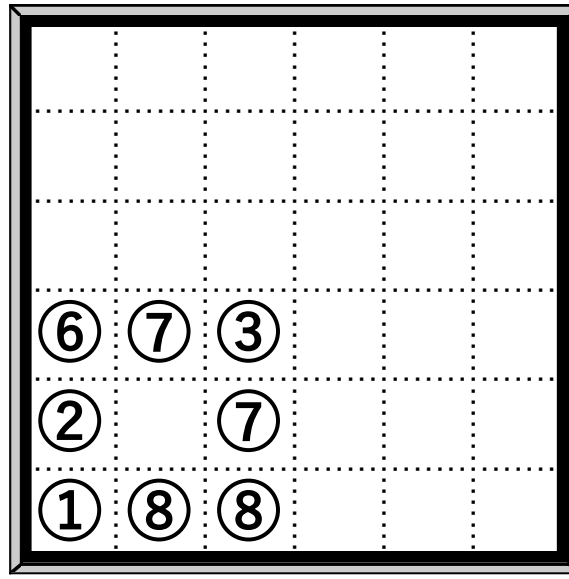

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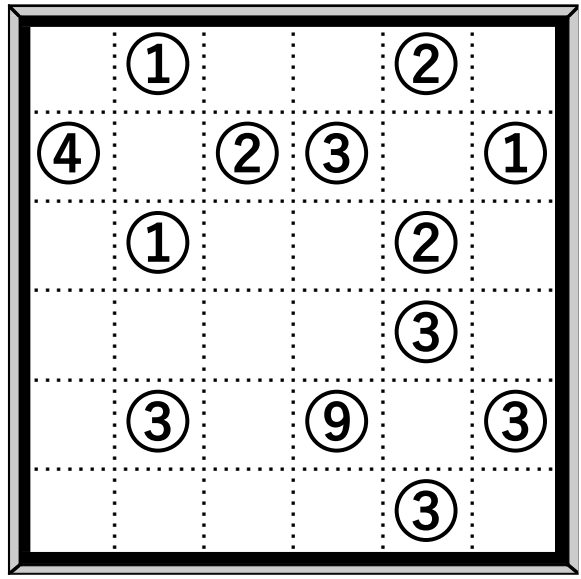

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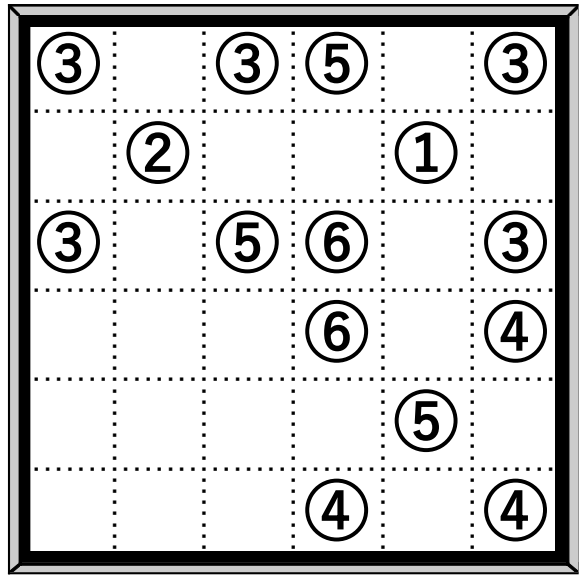

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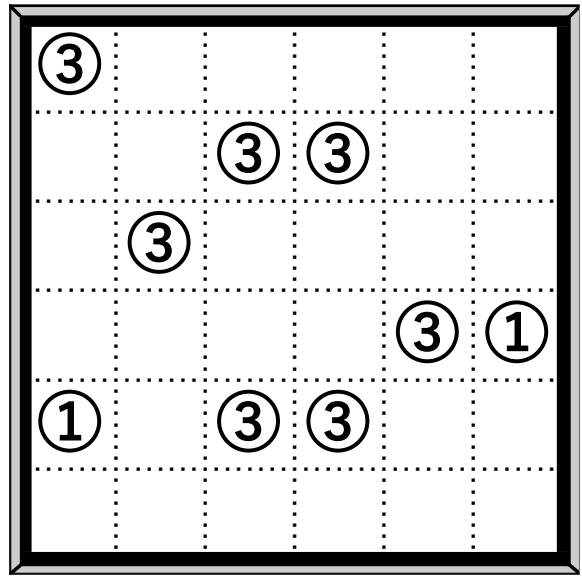

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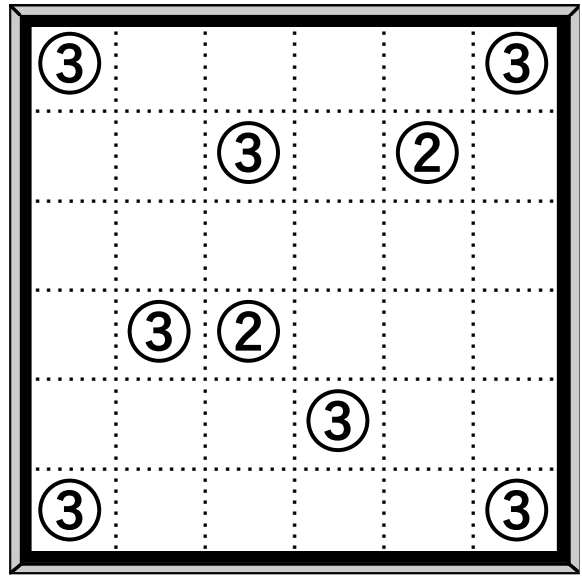

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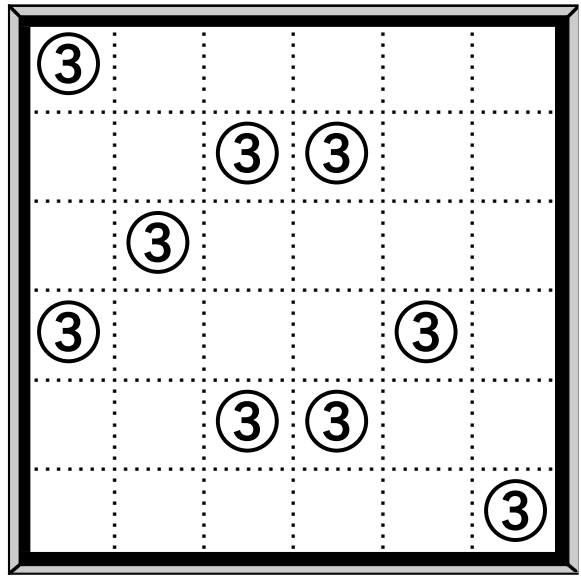

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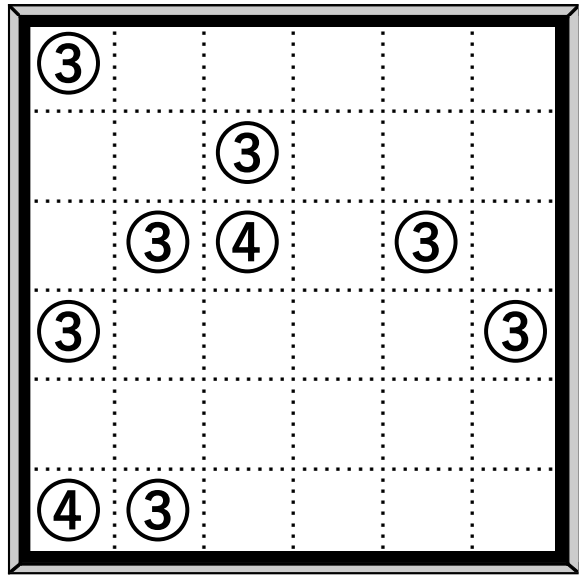

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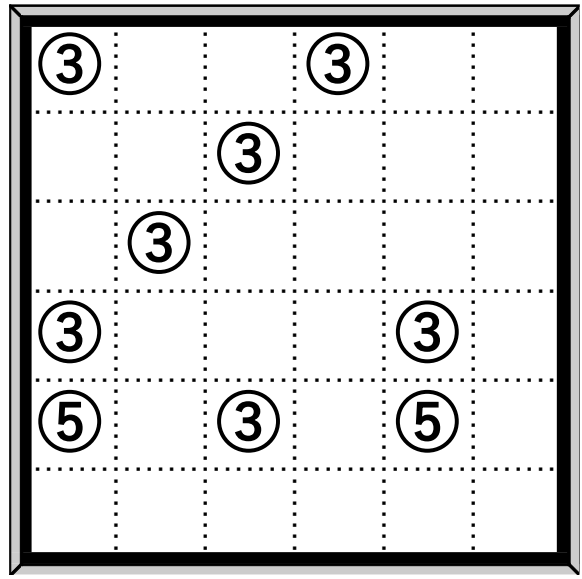

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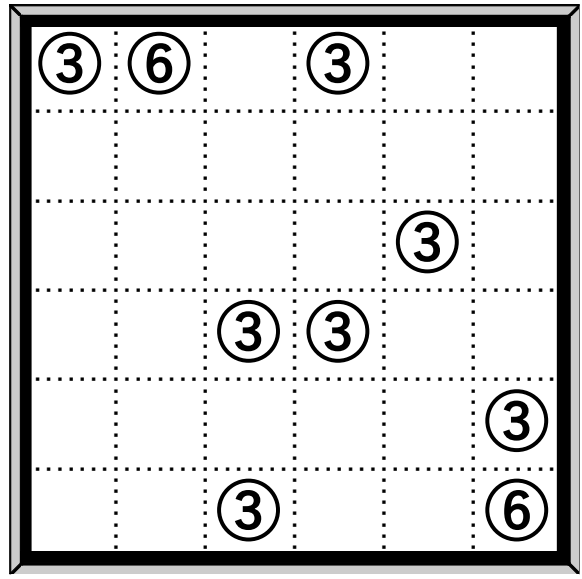

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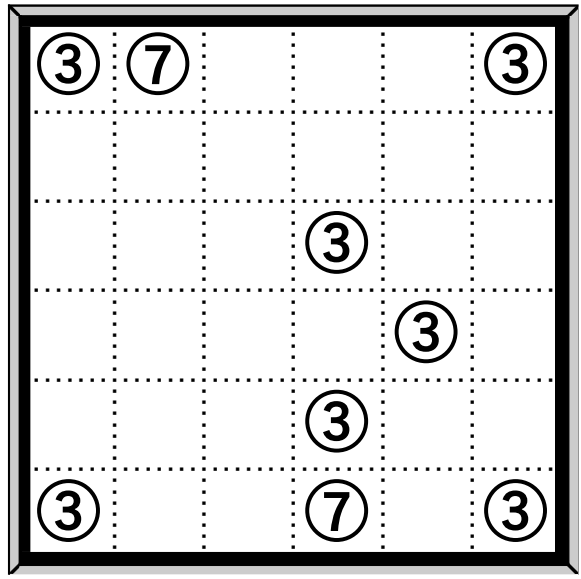

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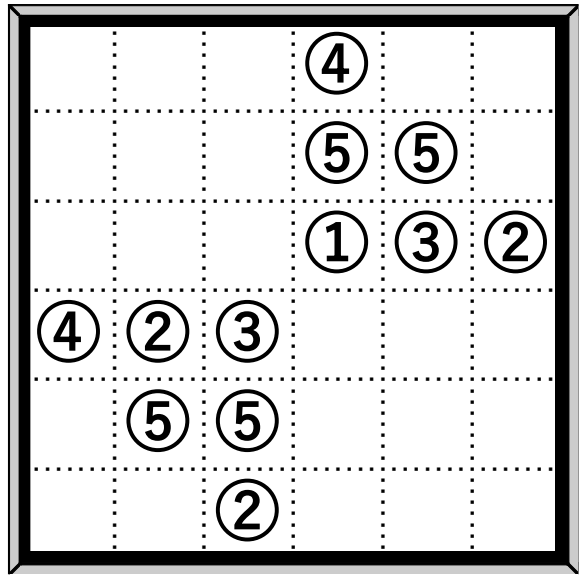

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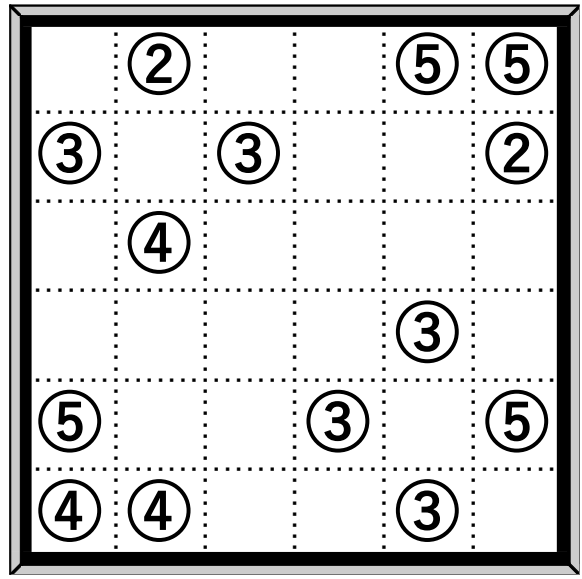

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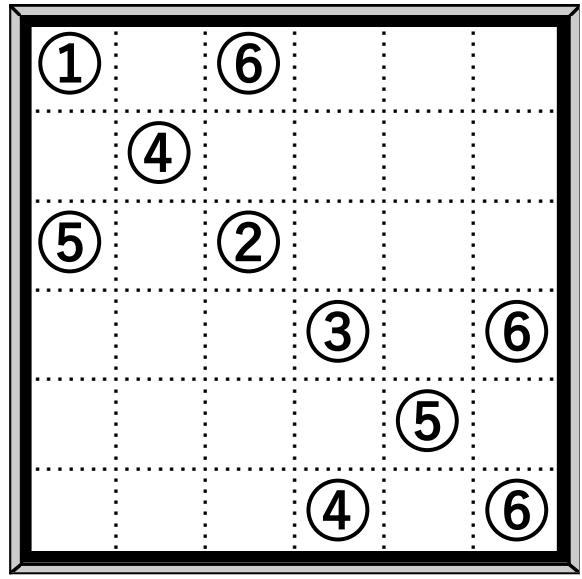

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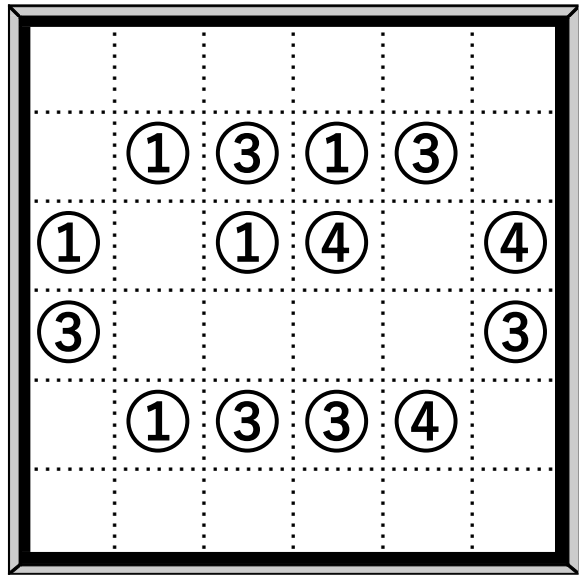

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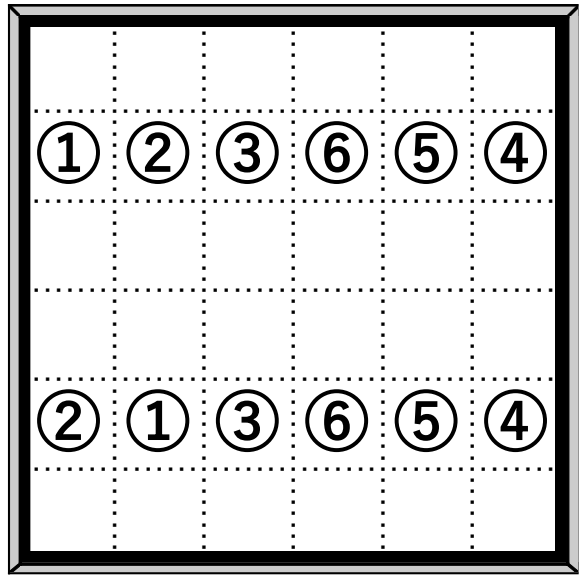

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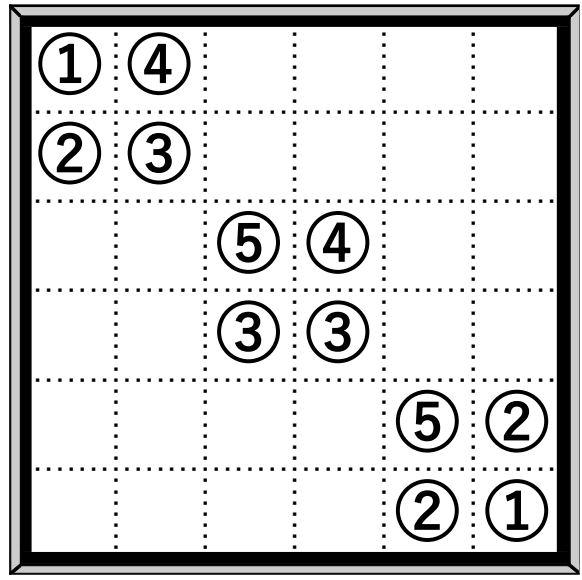

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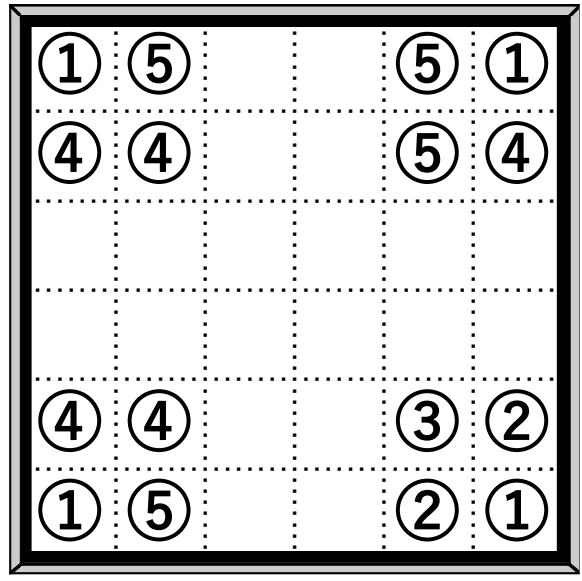

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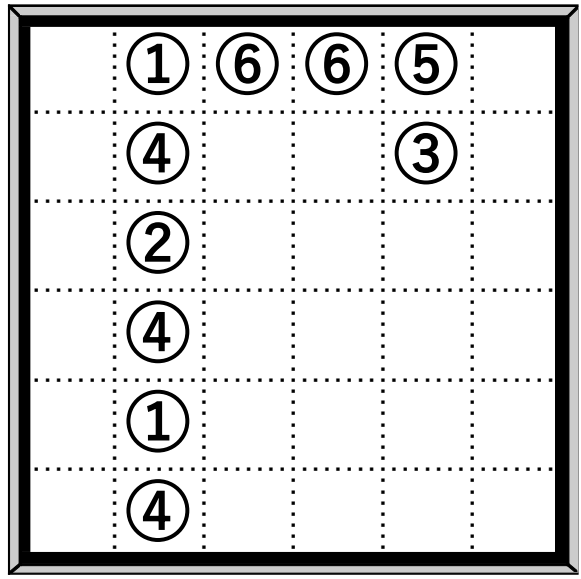

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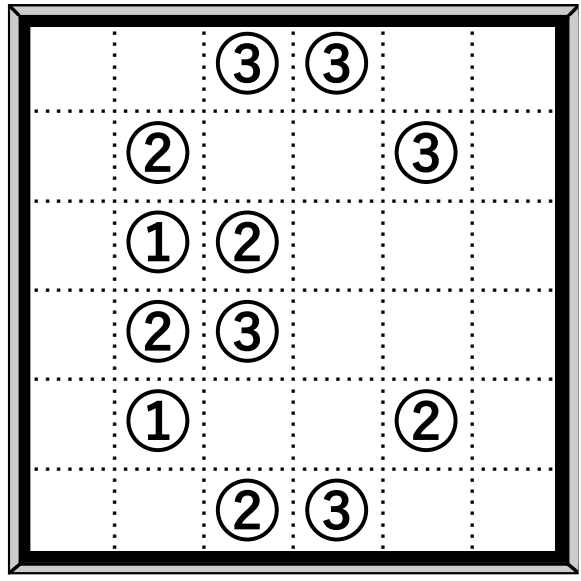

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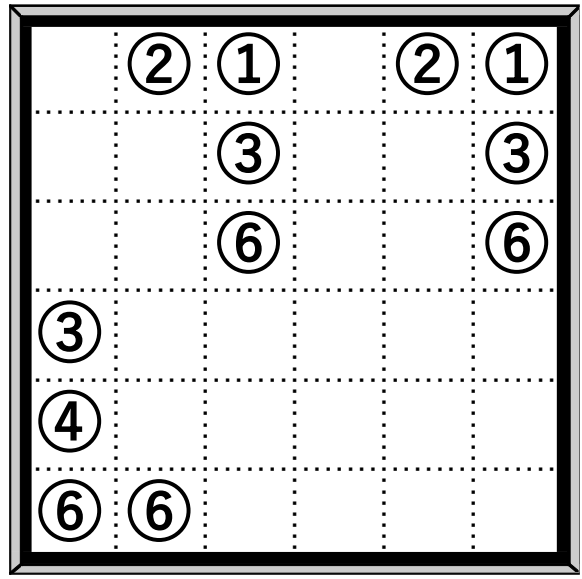

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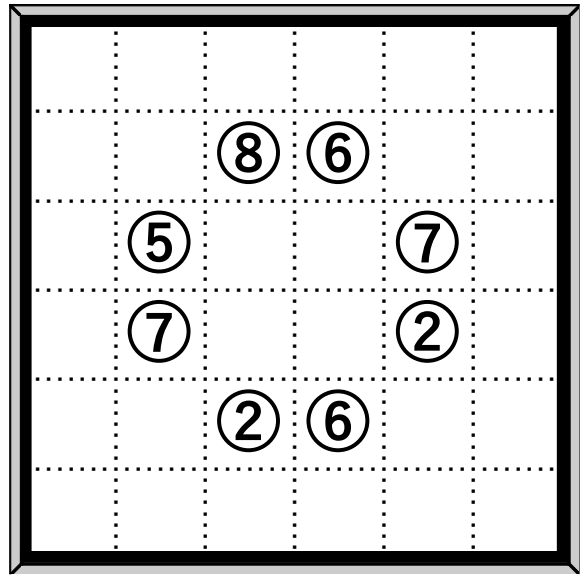

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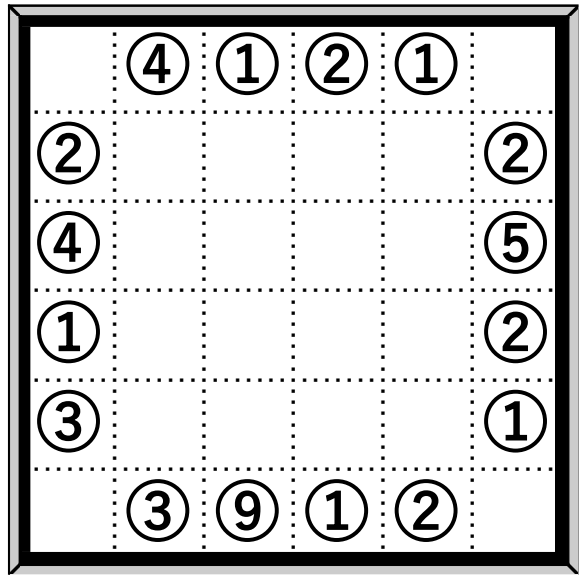

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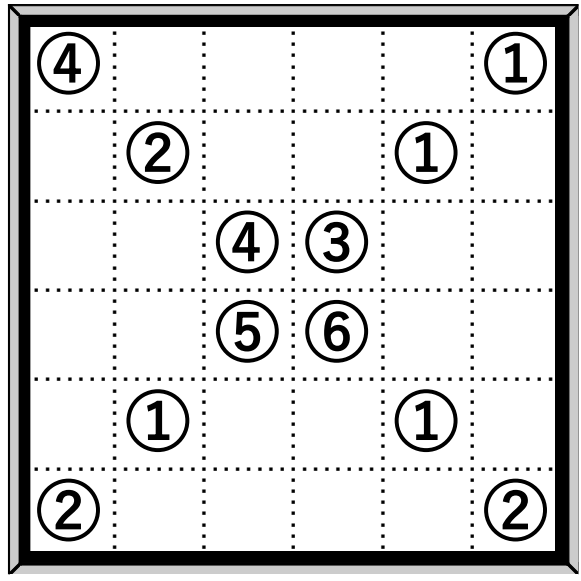

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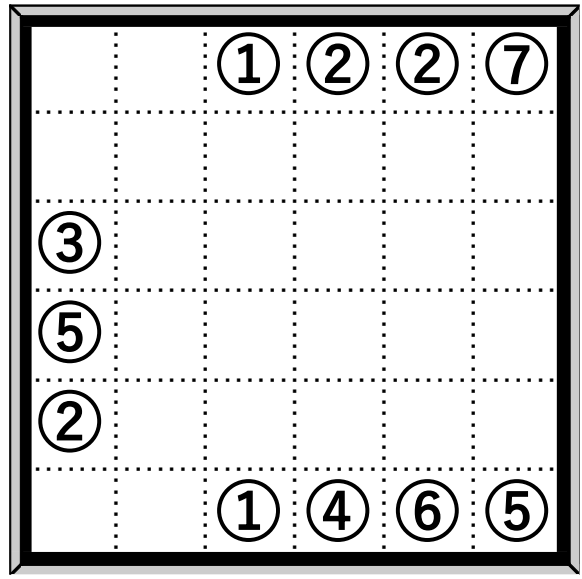

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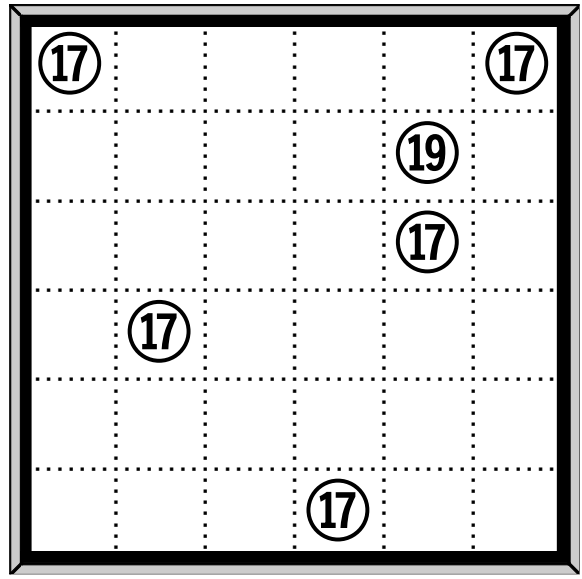

7 x 7 PUZZLES

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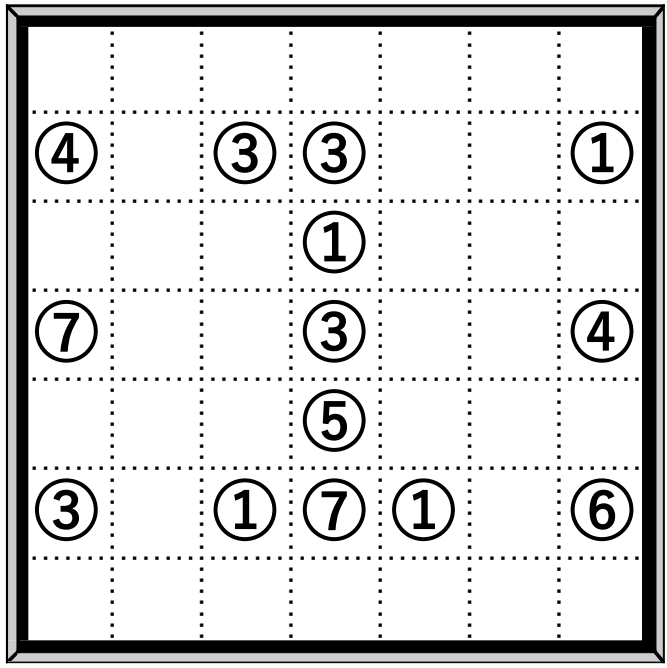
51	52								

PUZZLE NO. 1



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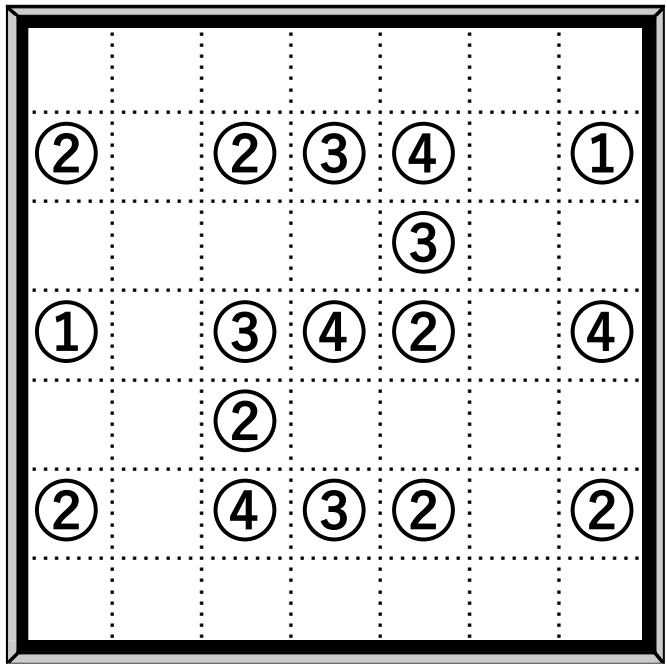

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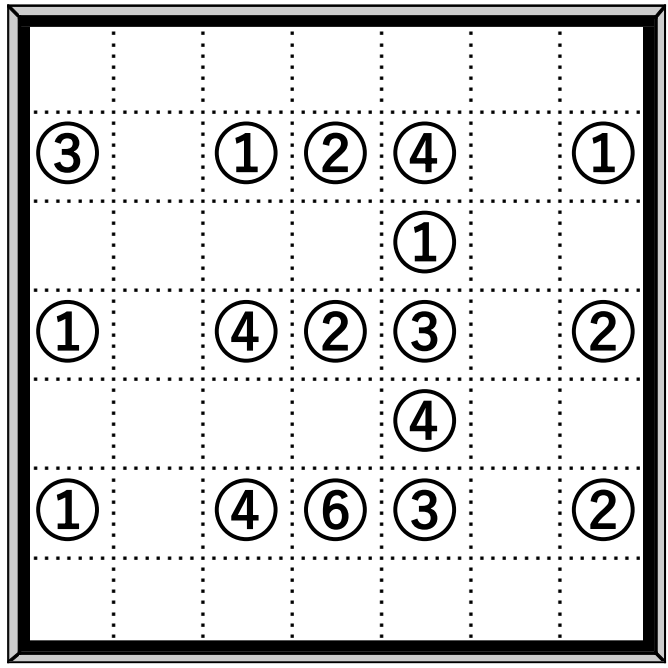

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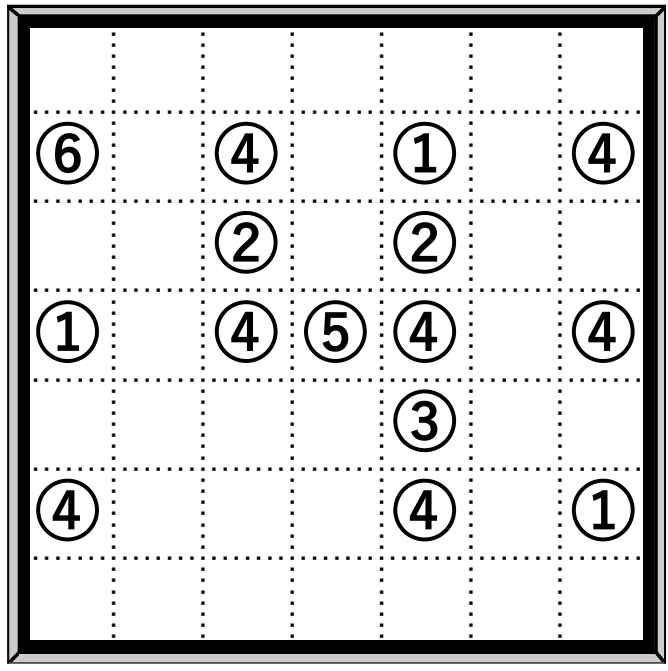

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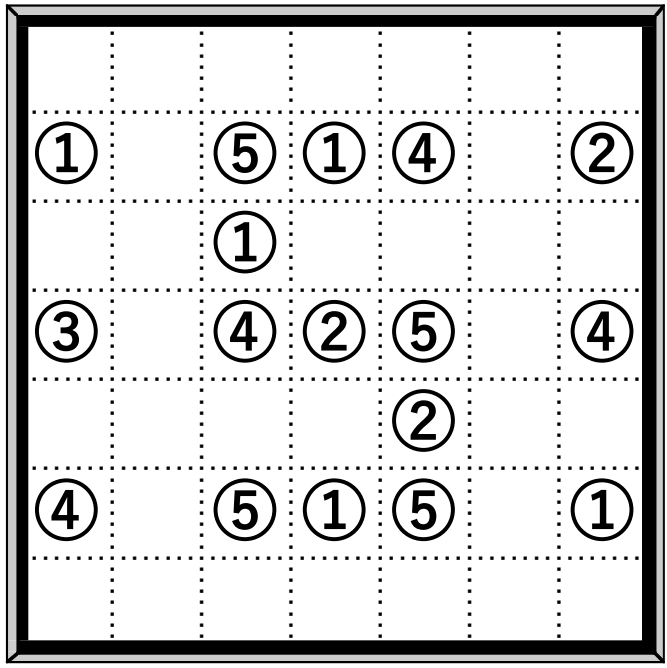

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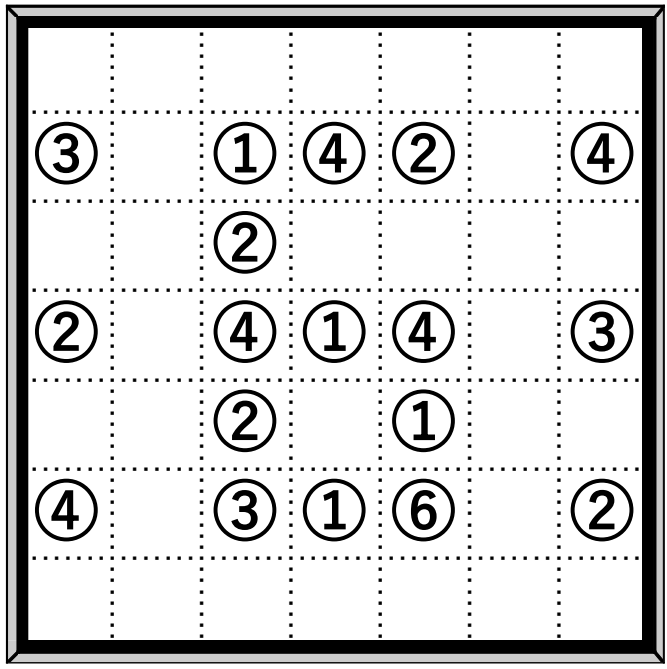

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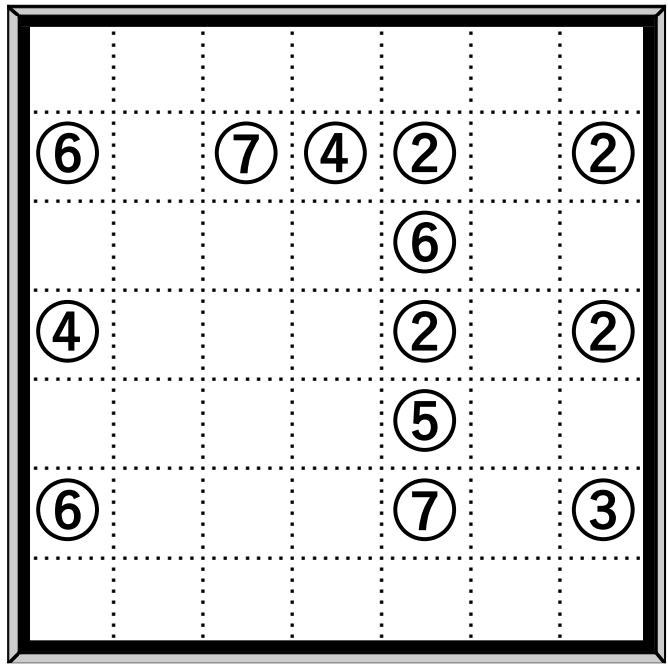

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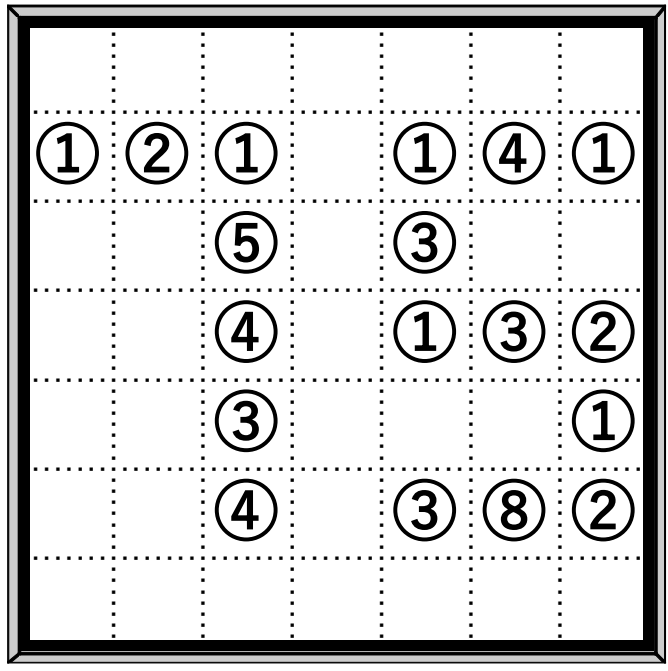

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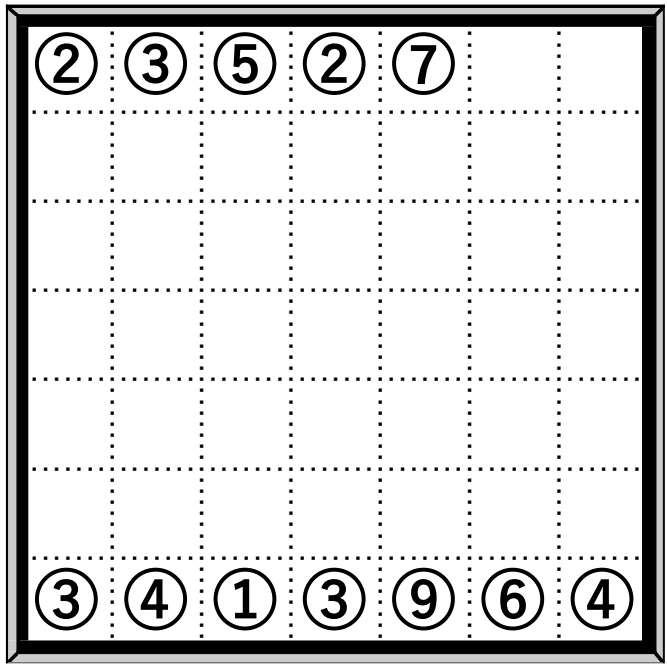

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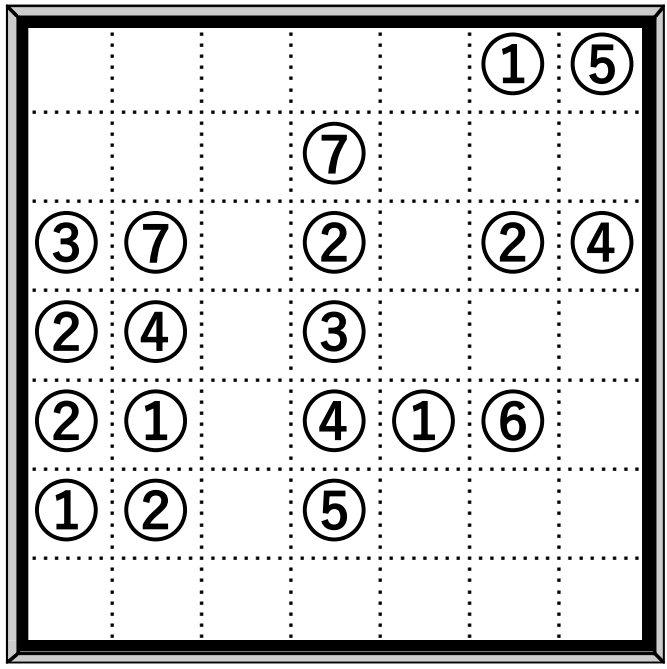

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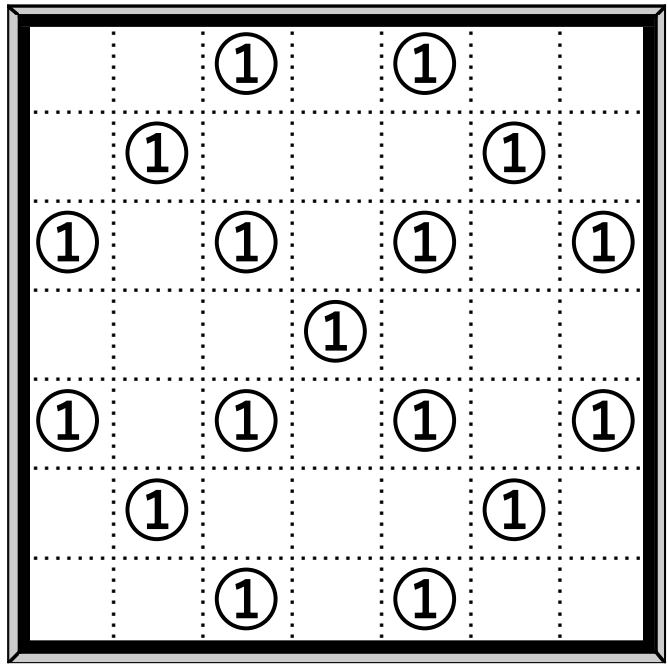

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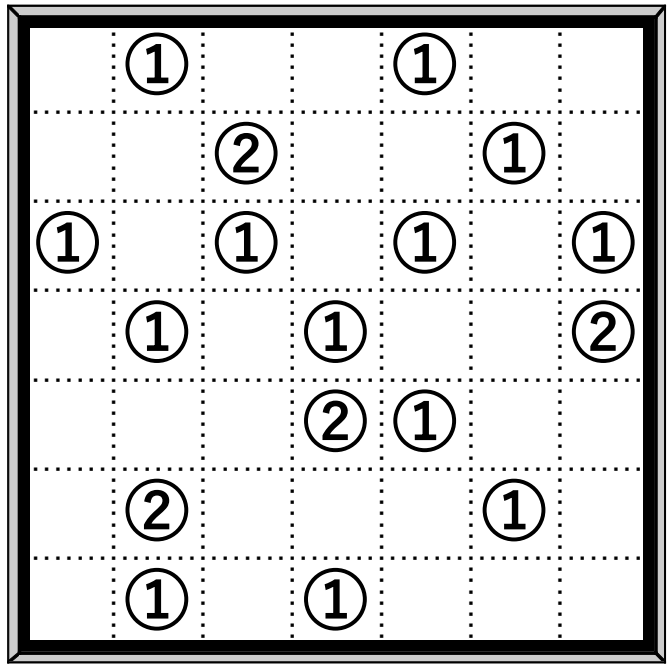

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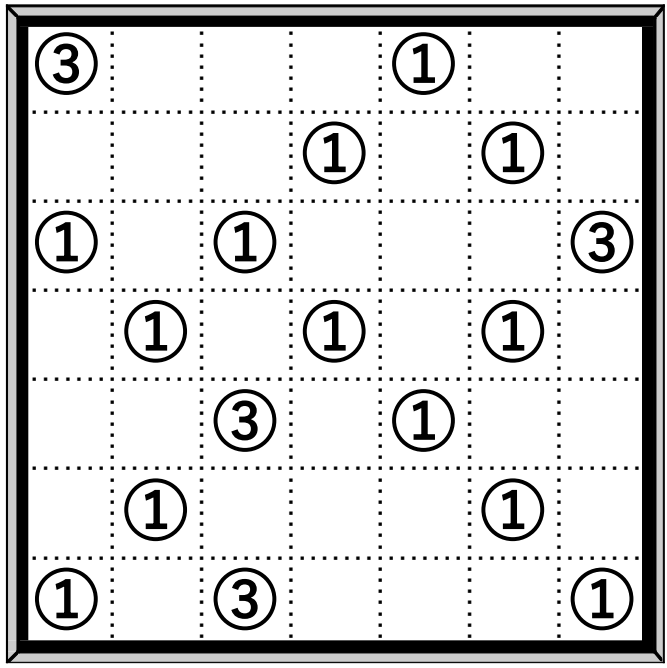

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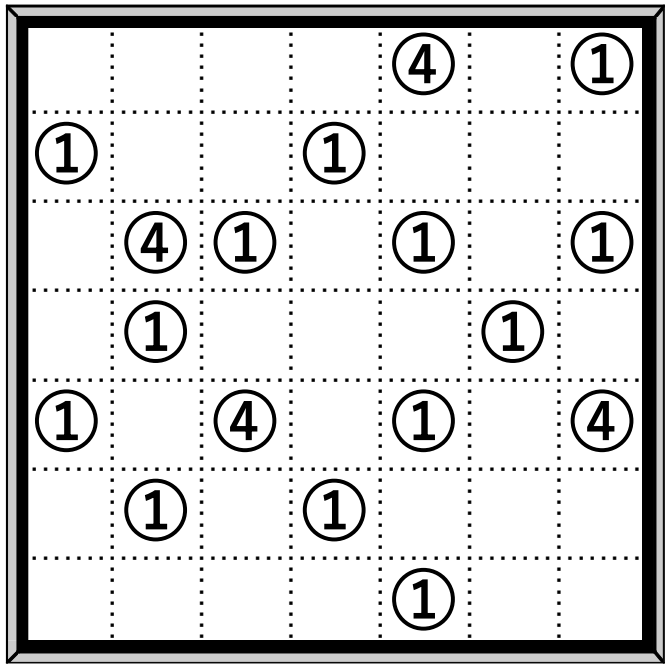

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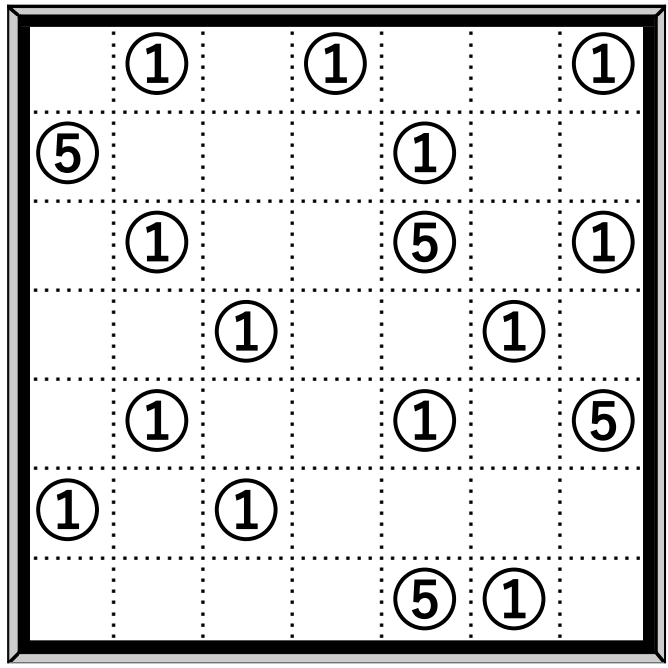

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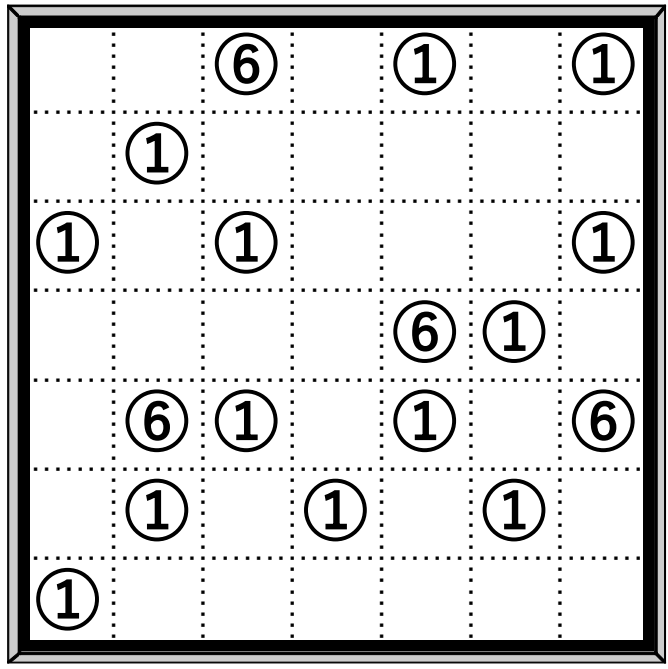

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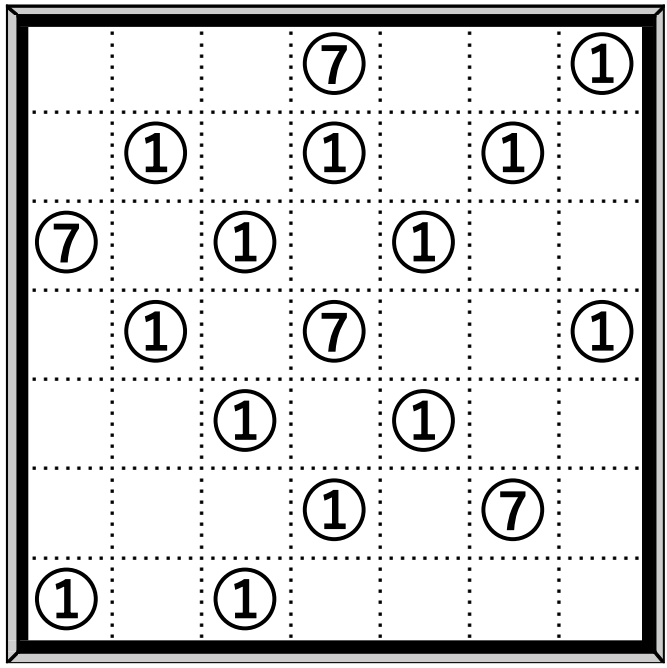

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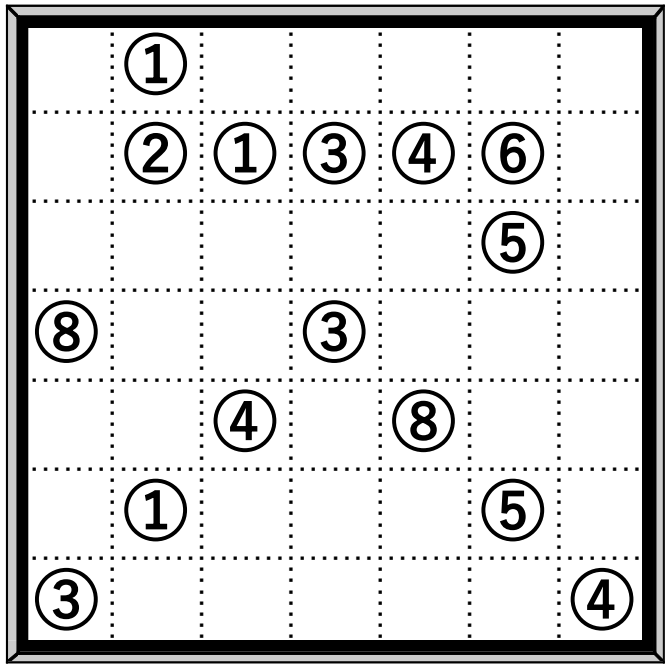

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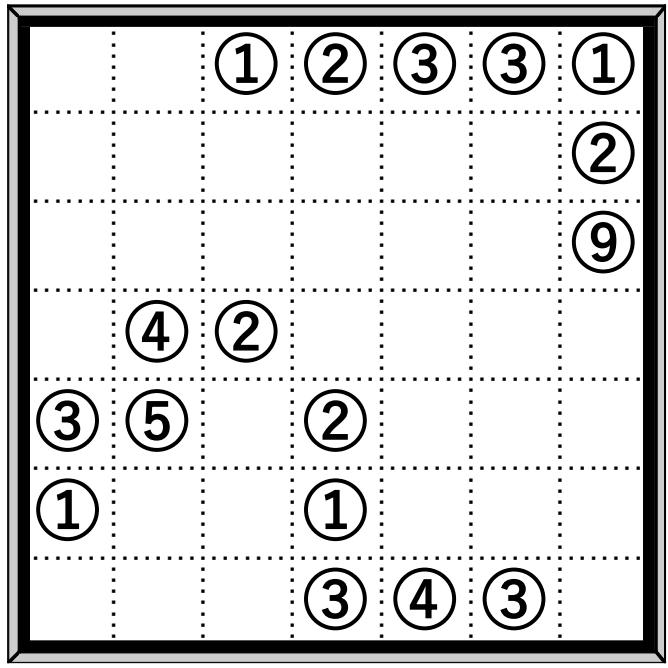

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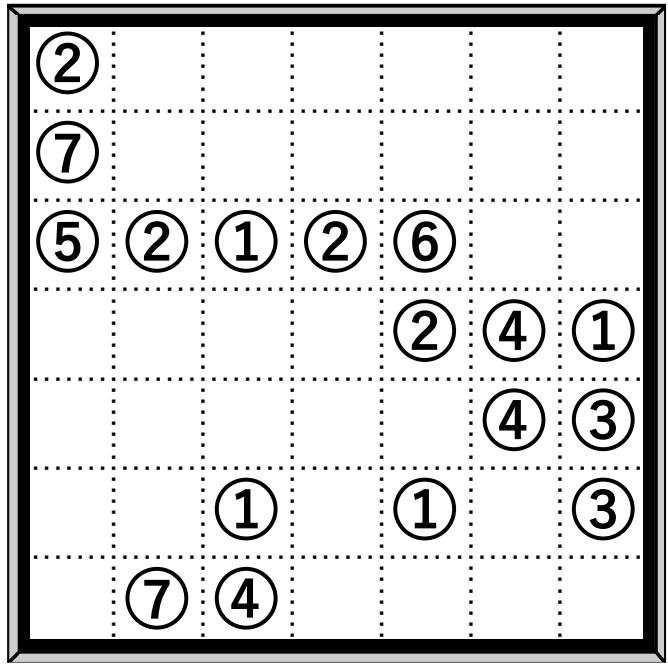

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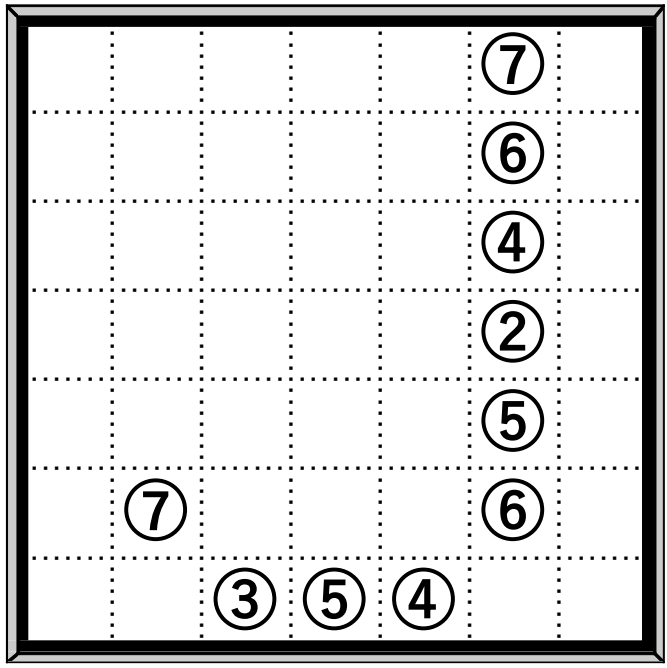

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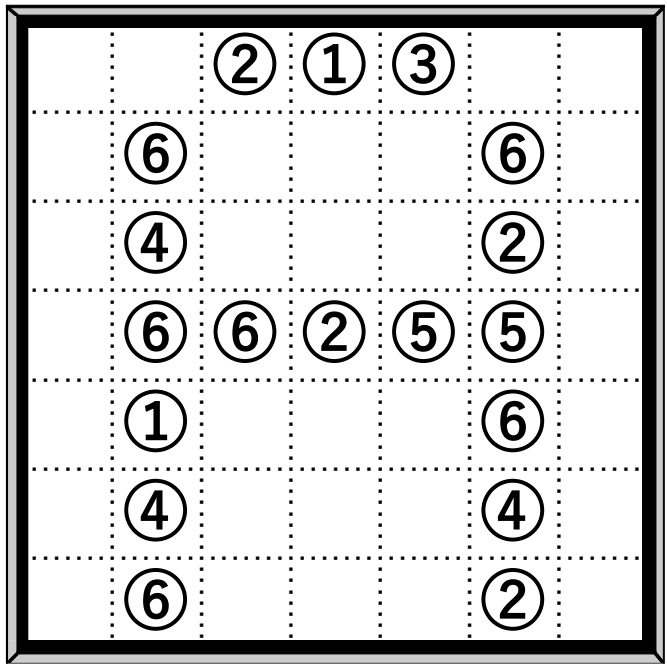
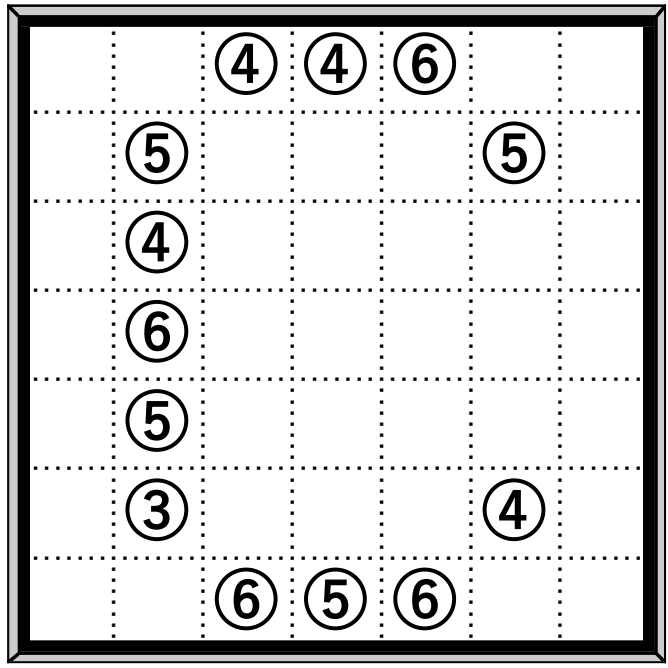


PUZZLE NO. 23



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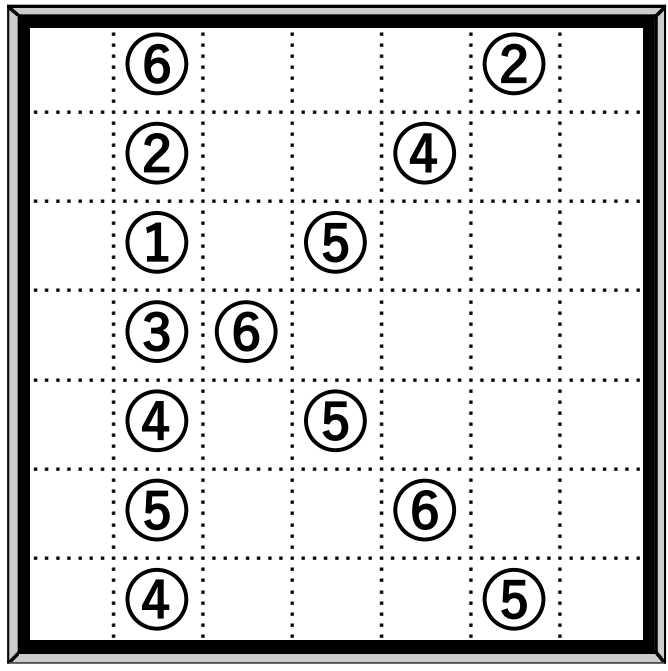

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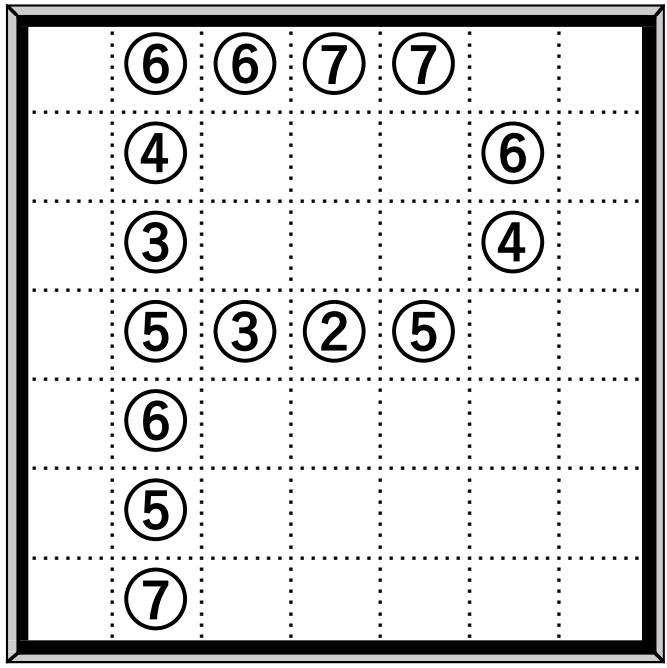

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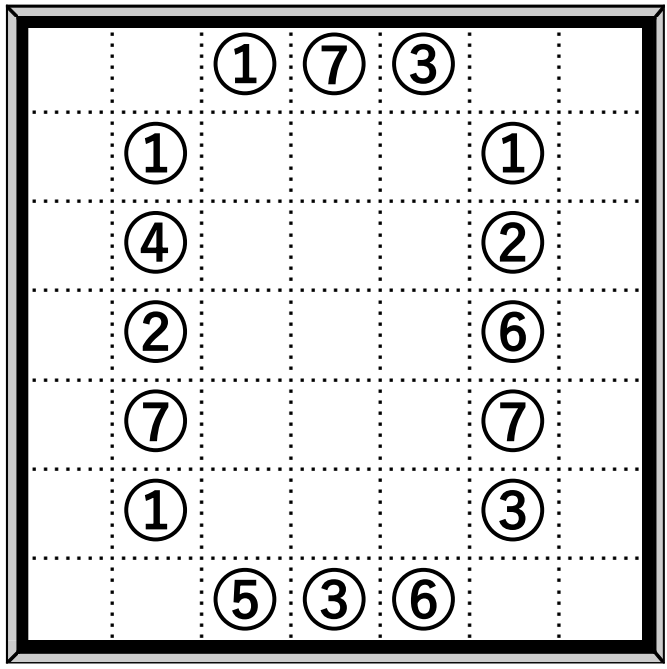

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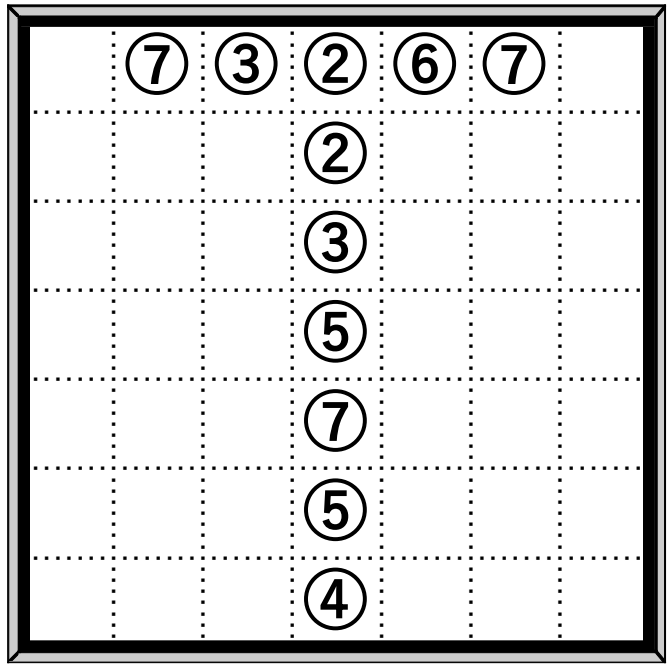

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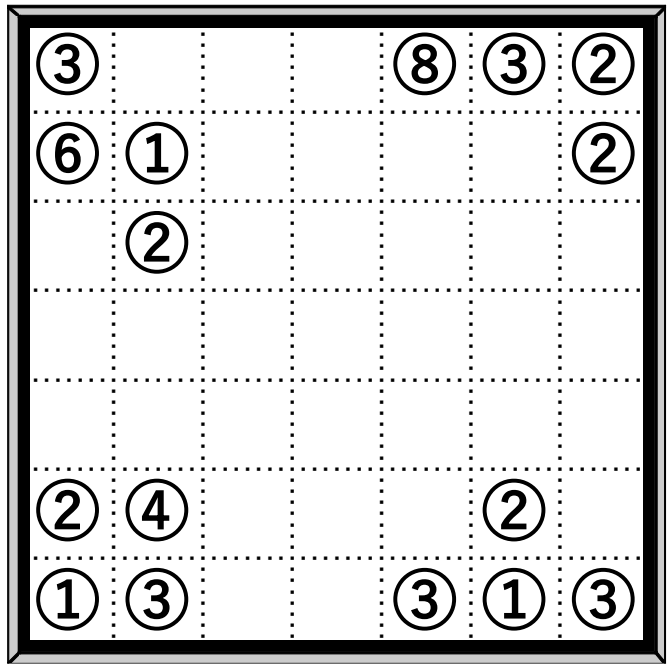

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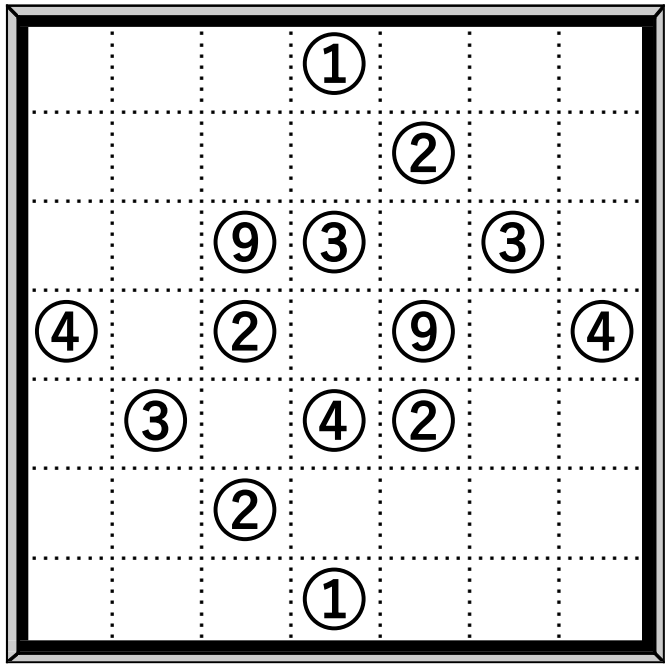

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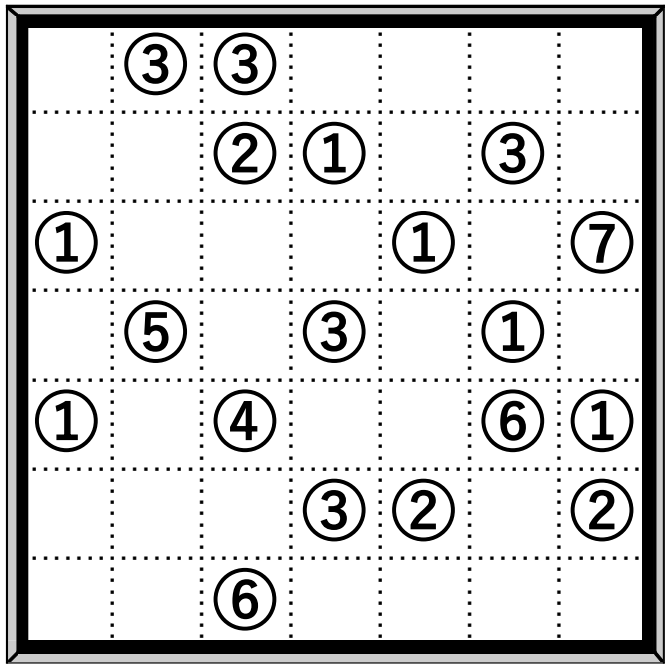

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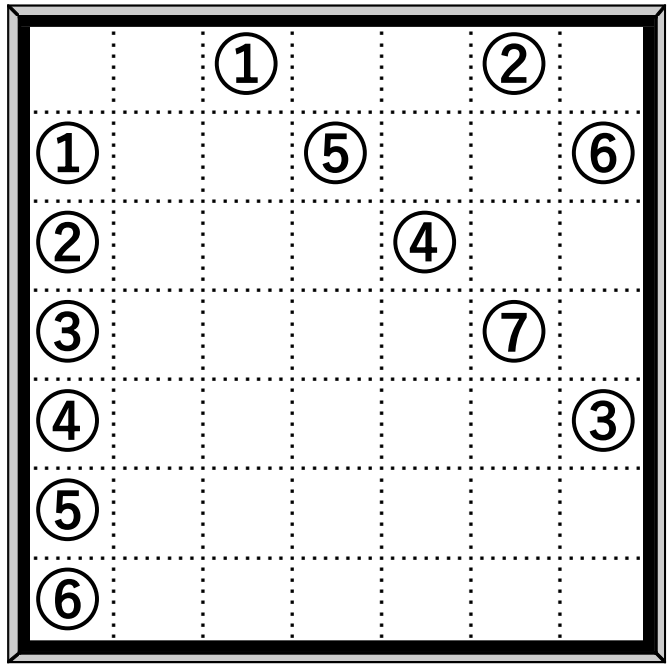

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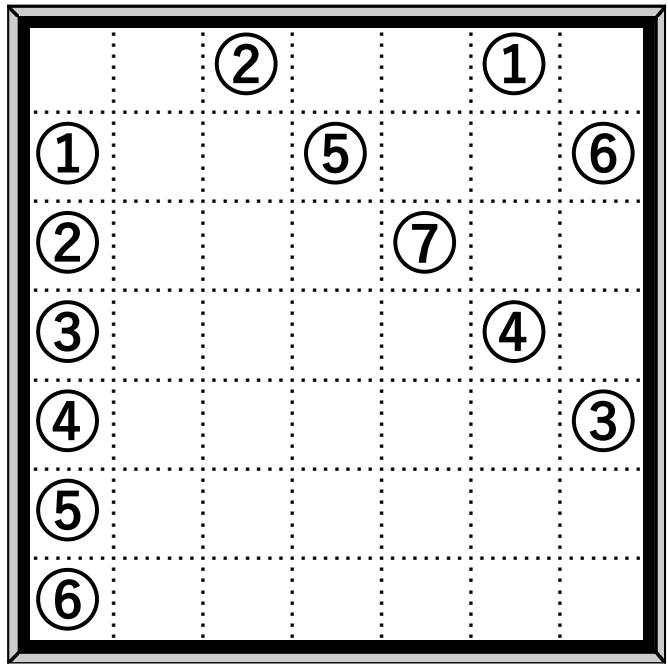

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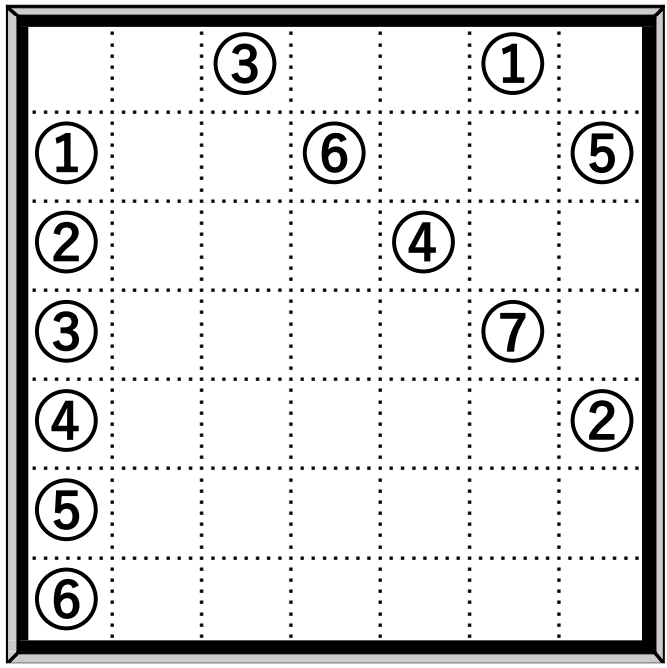

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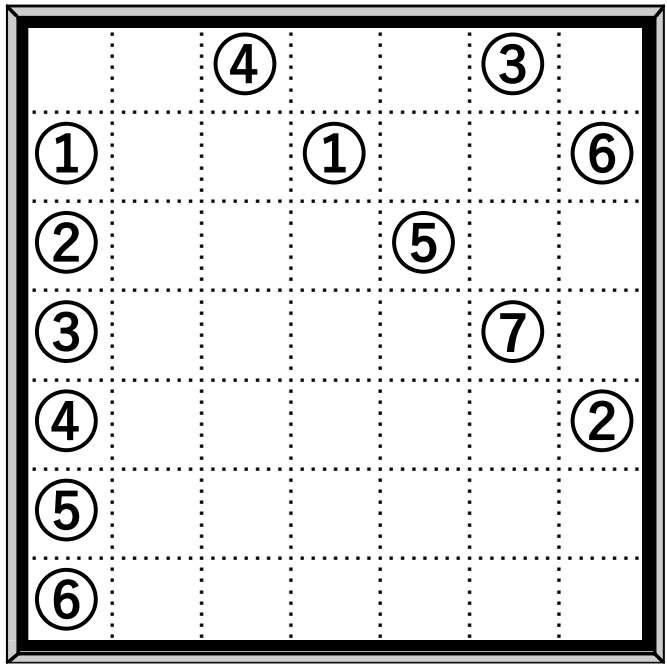

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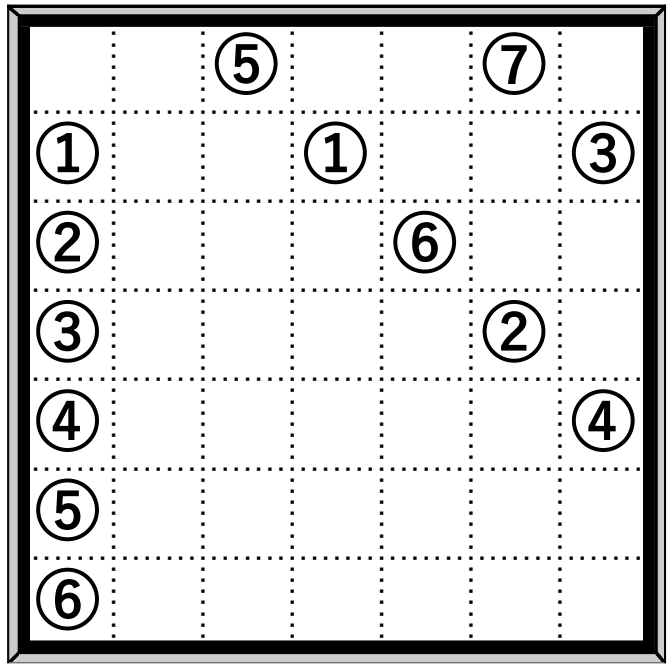

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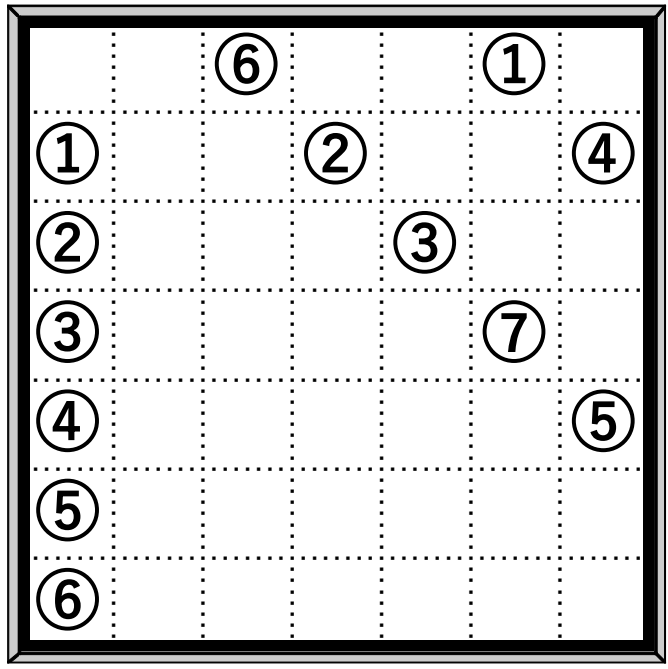

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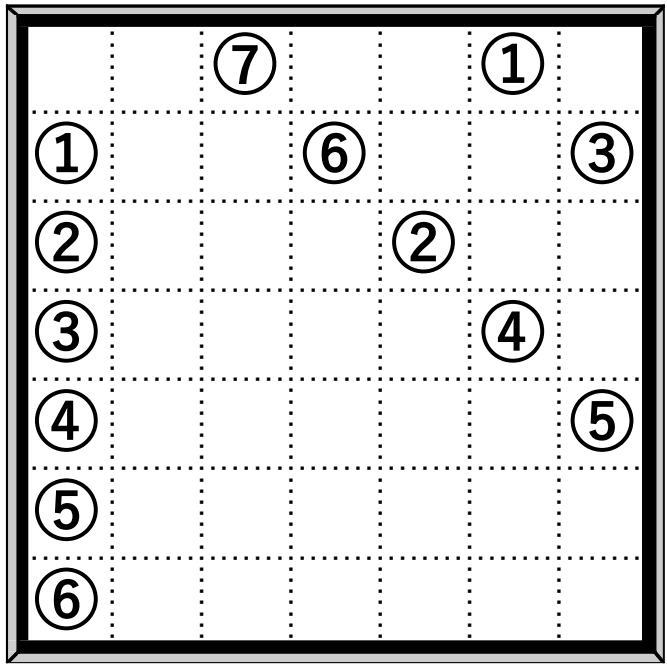

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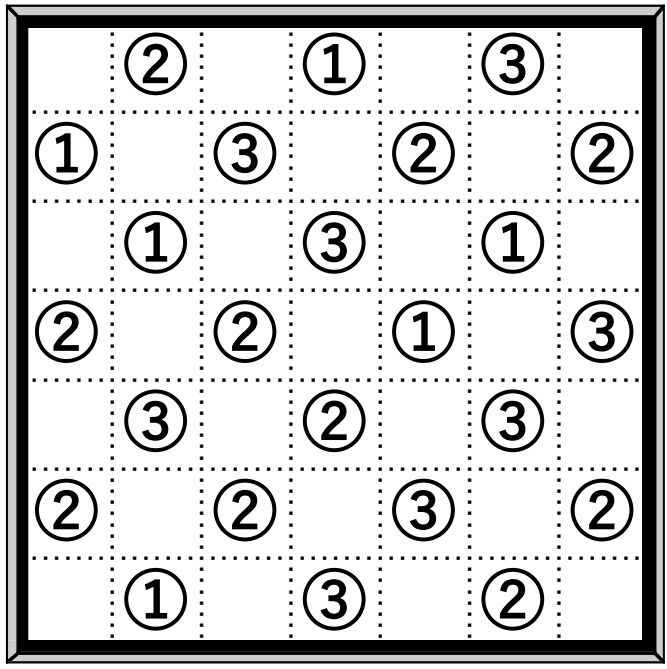

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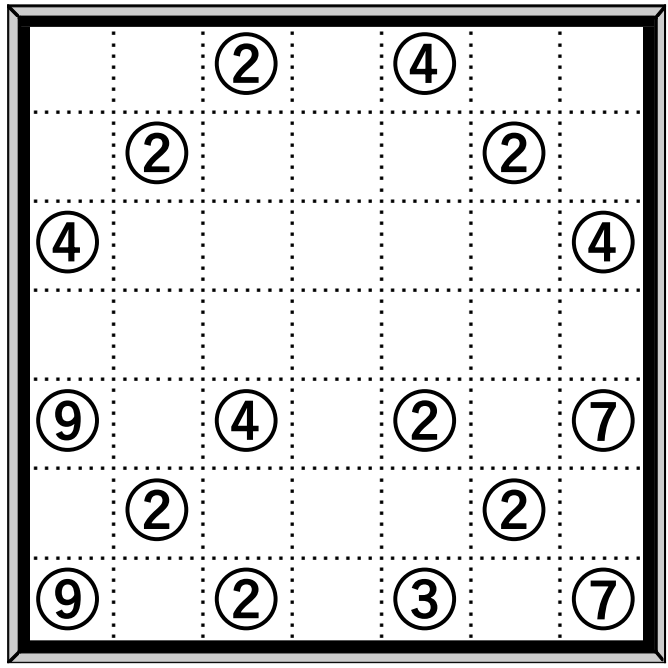

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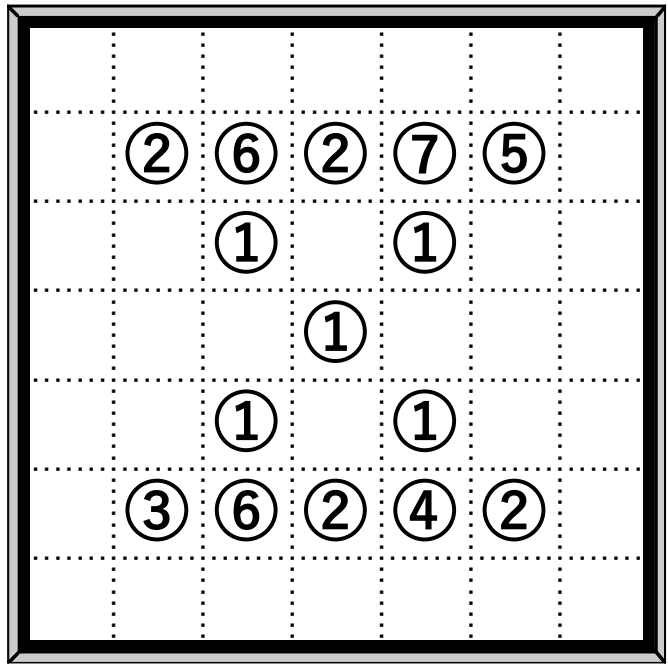

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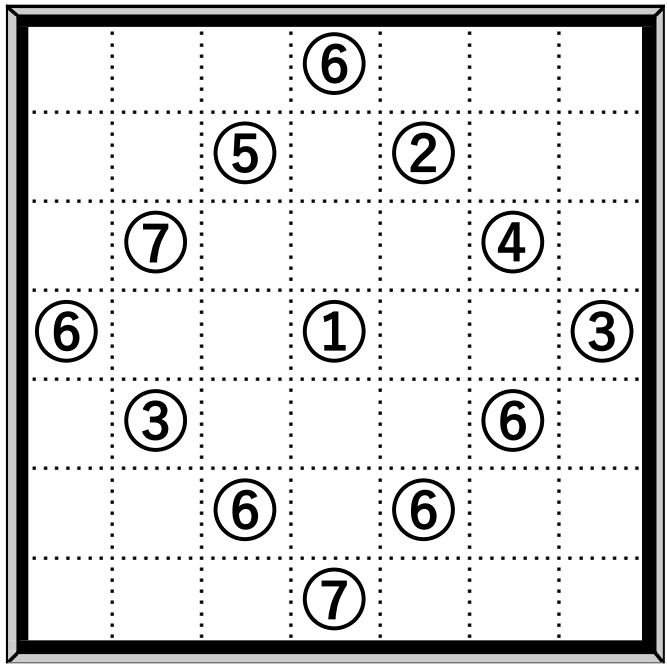

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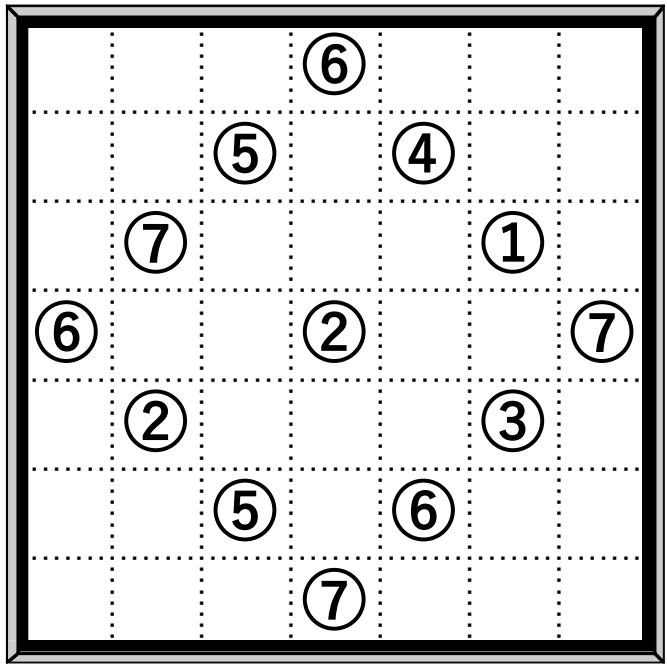

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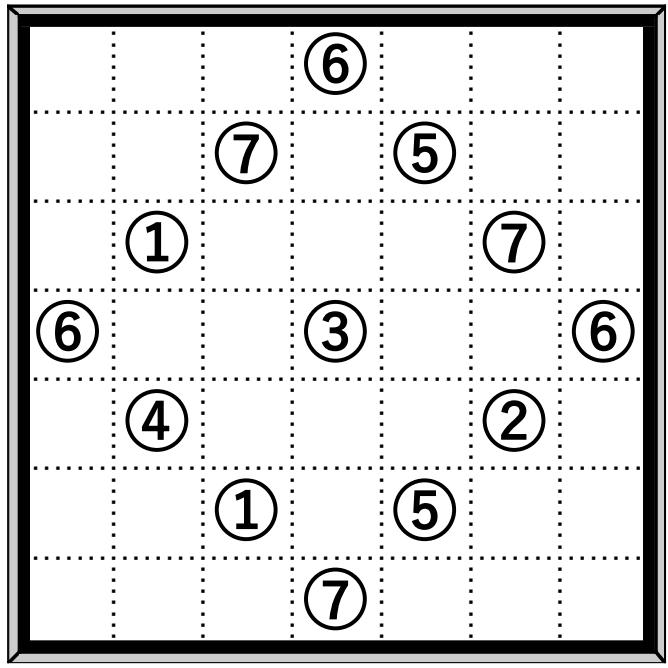

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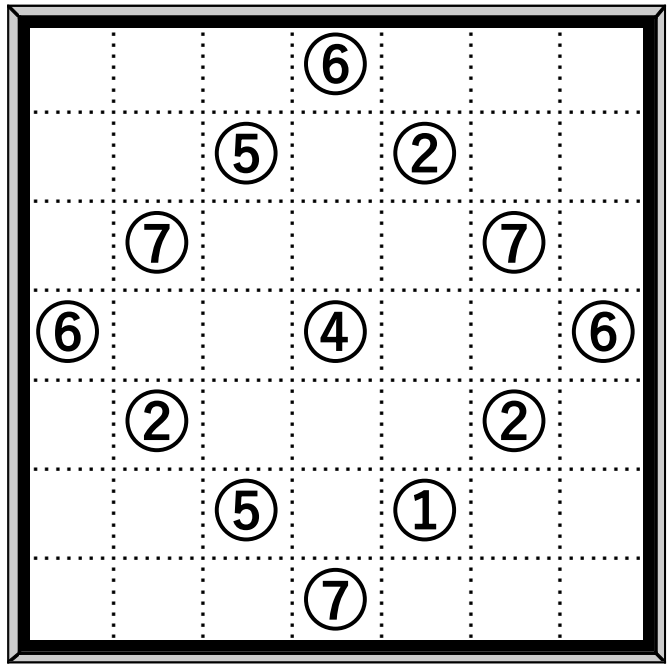

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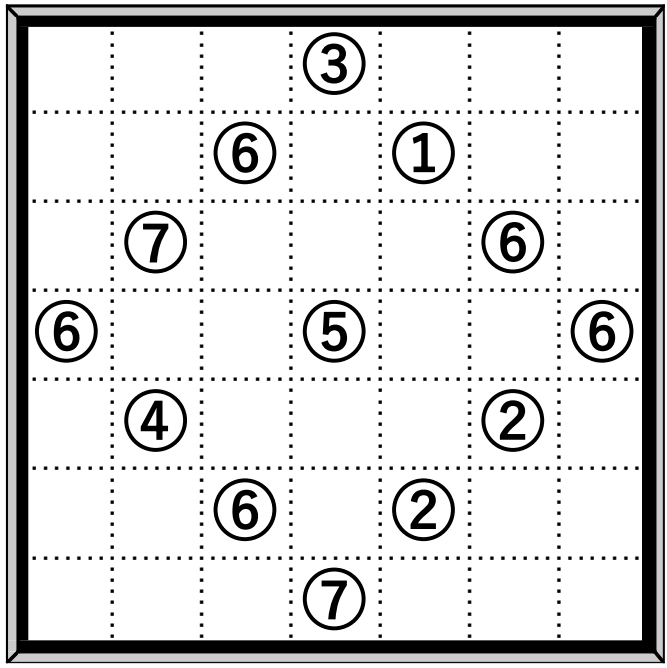

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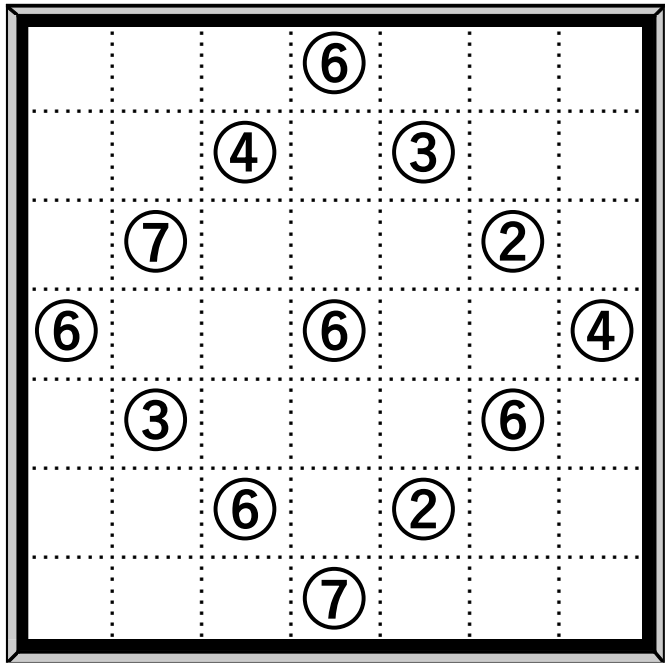

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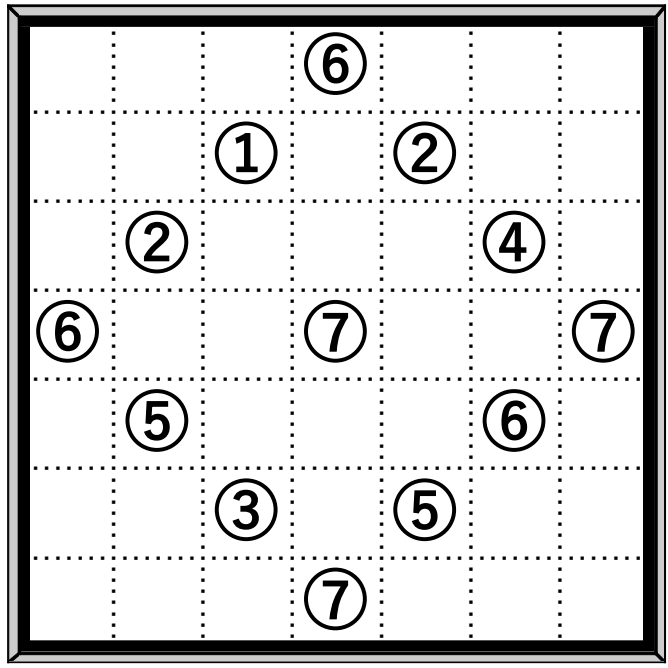

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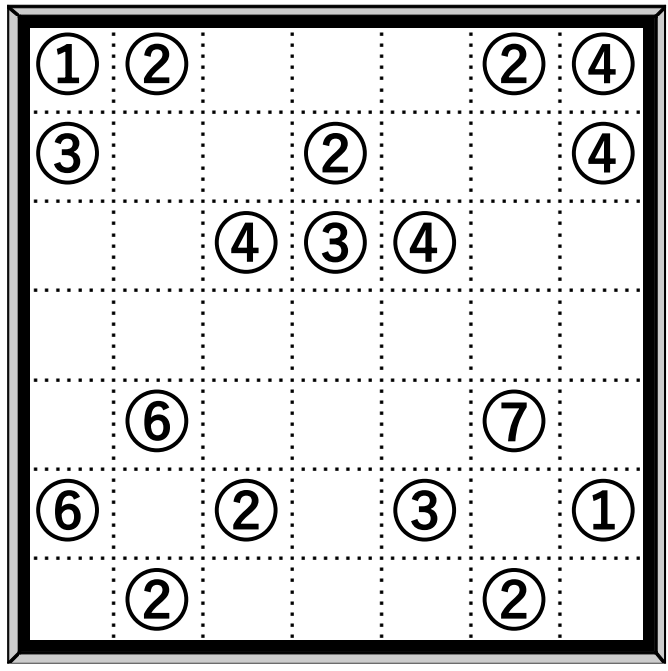

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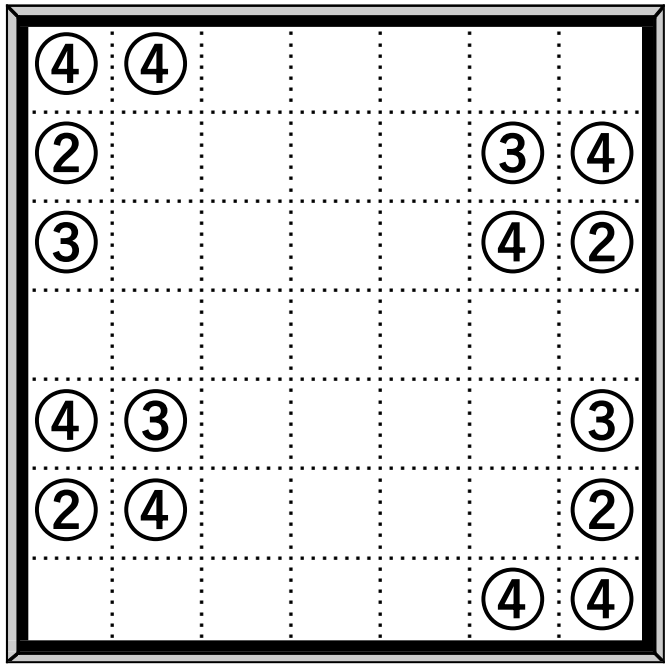

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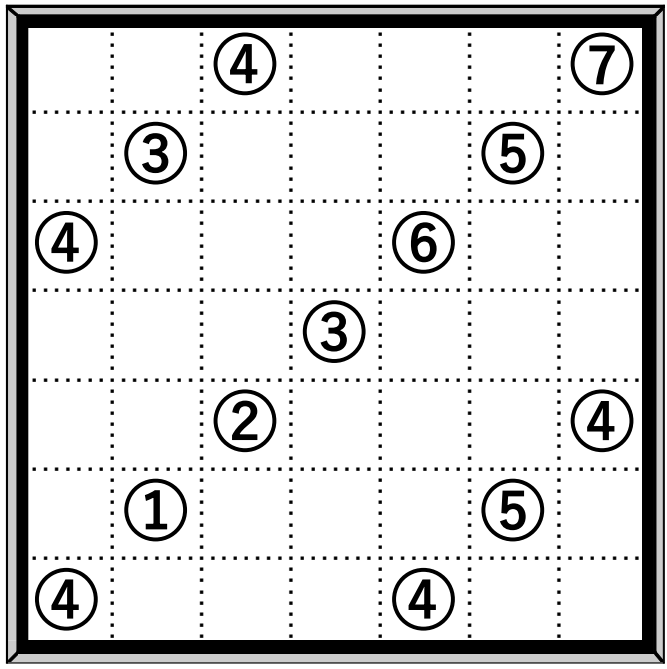

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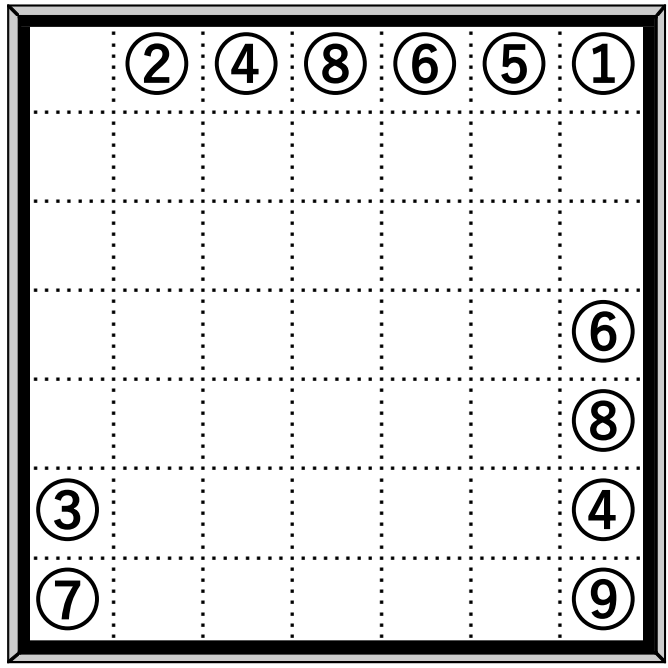

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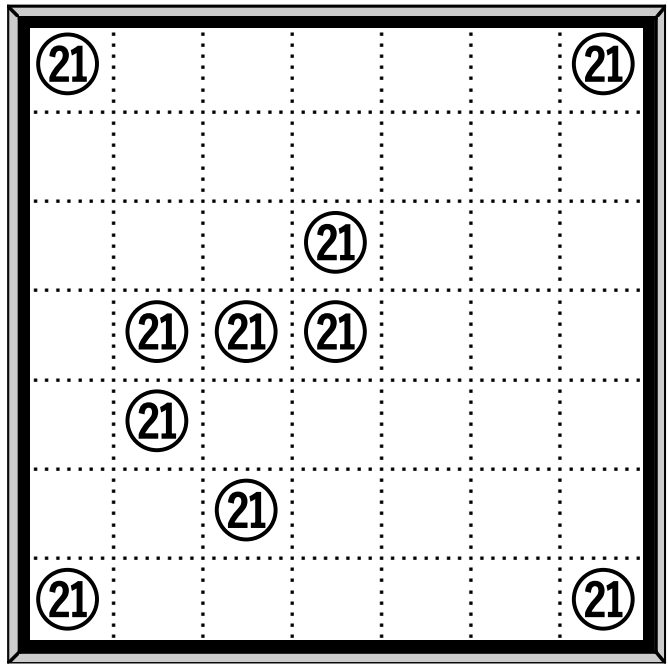
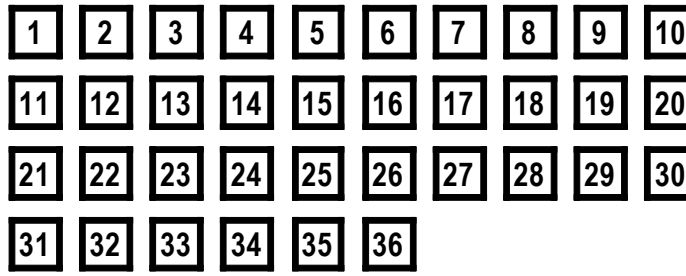


8 x 8 PUZZLES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11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
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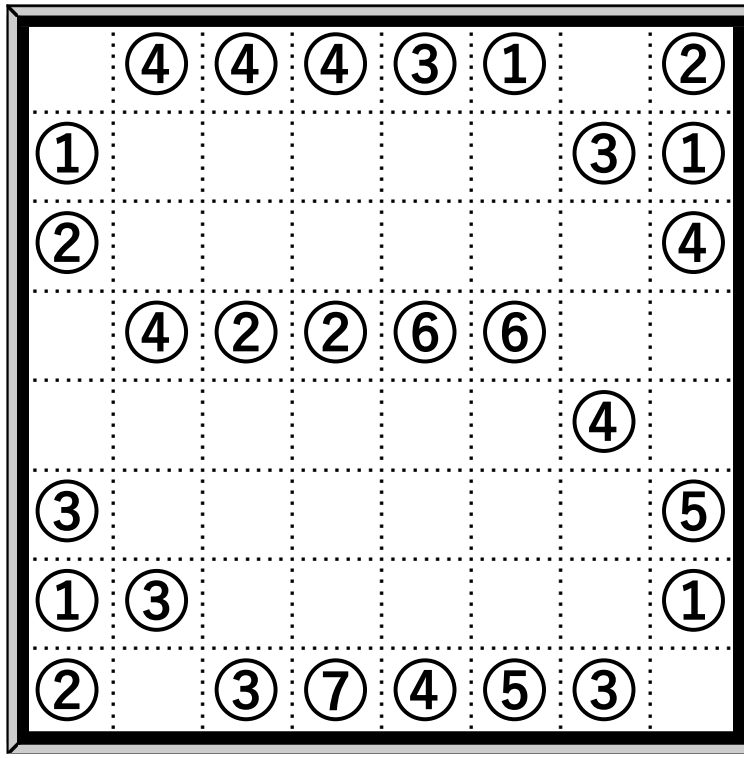
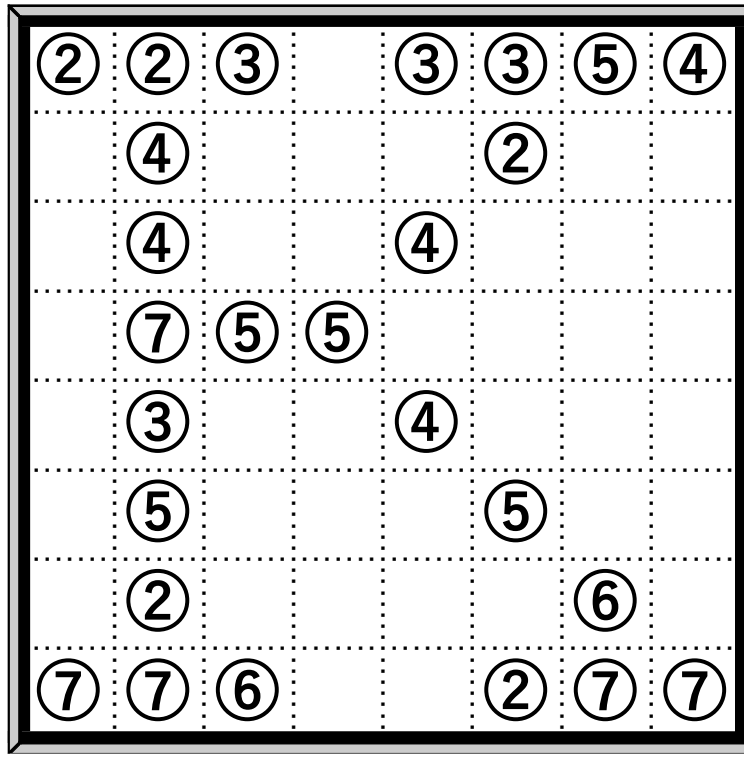
PUZZLE NO. 1



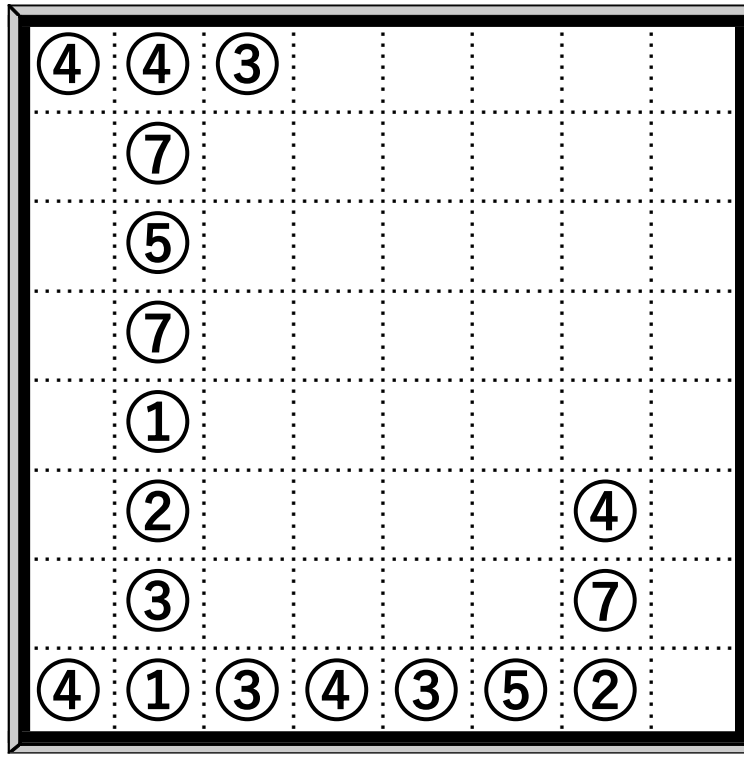
PUZZLE NO. 2



PUZZLE NO. 3

⑦	⑦	④	①	⑤	②	⑦	⑦
	④						⑥
	①						
	④	④	④				
	⑤						
	④						
	④						⑥
③	③	⑤	⑤	⑤	⑥	③	①

PUZZLE NO. 4



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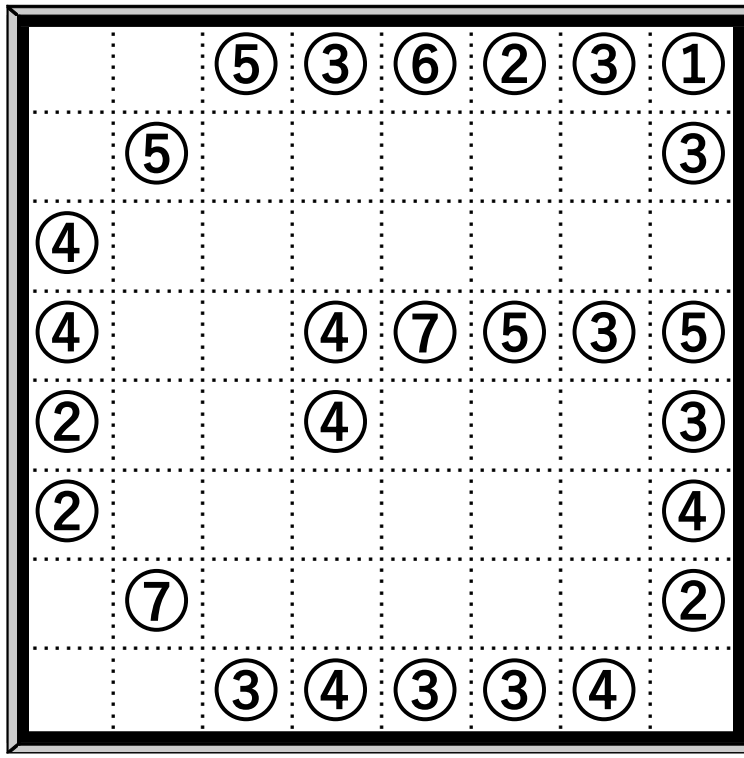
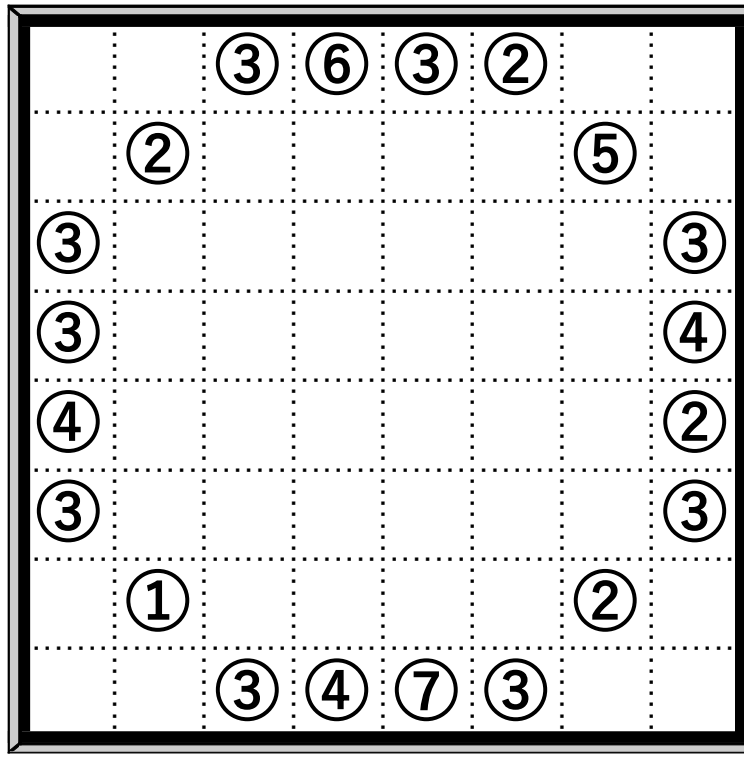


PUZZLE NO. 6



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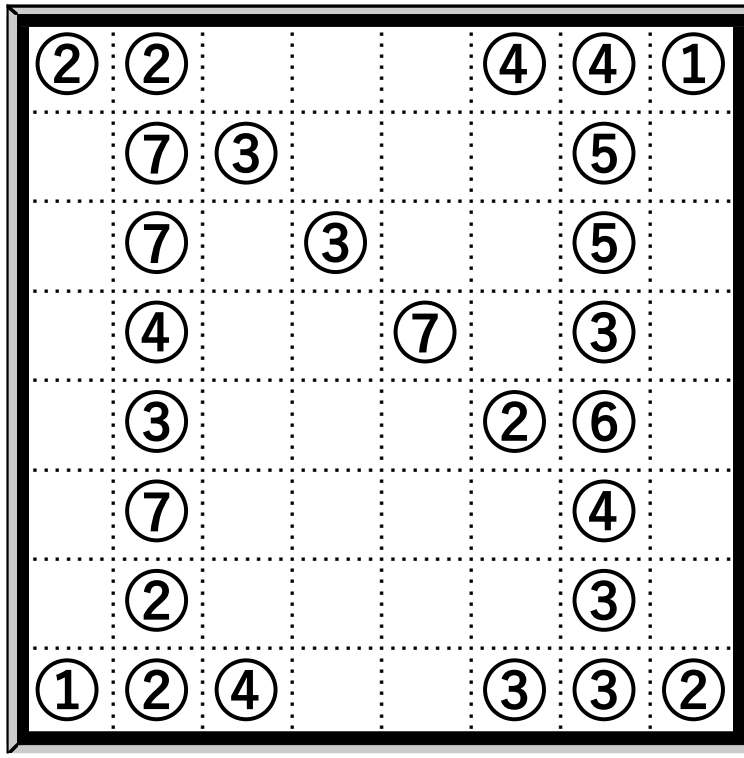

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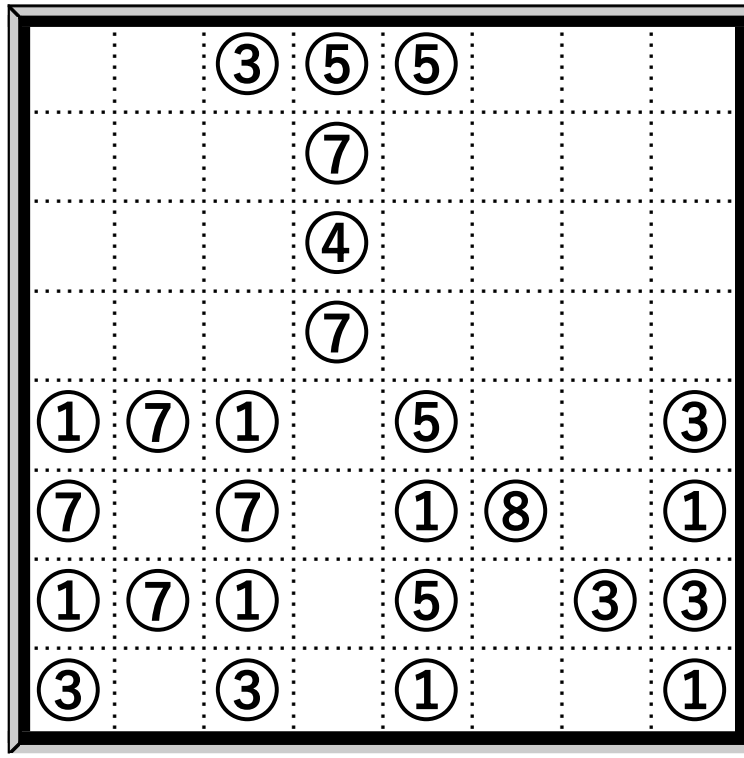

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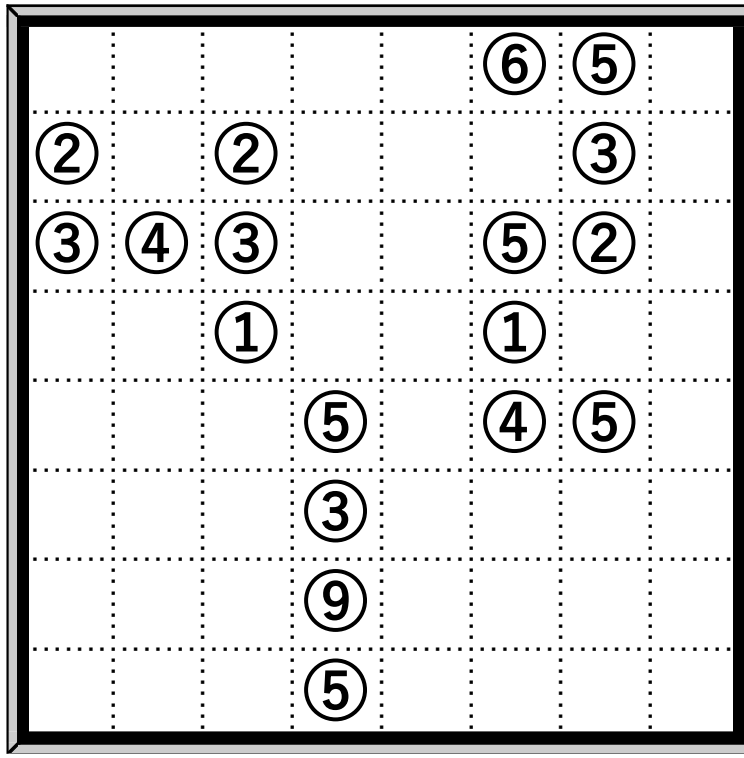

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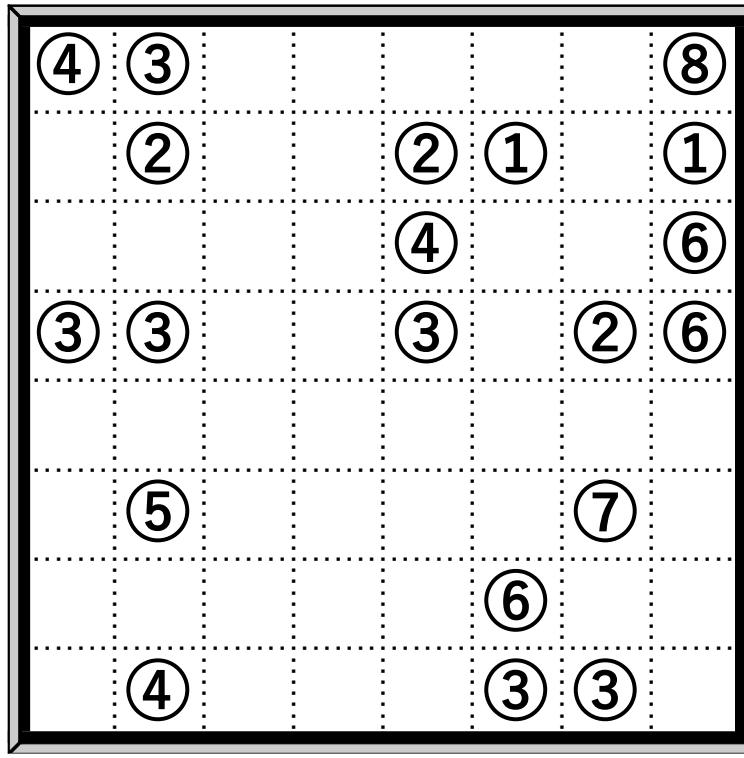

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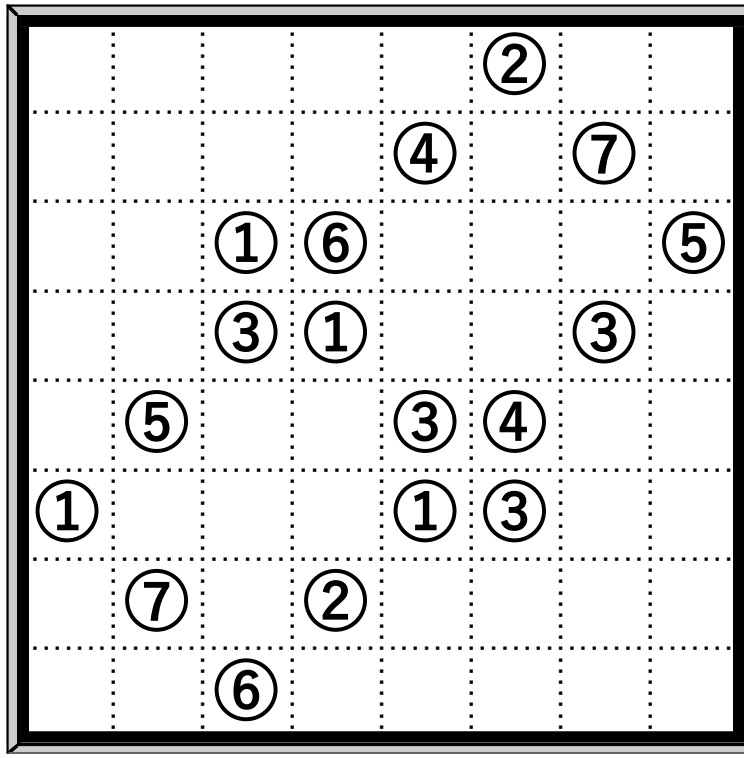

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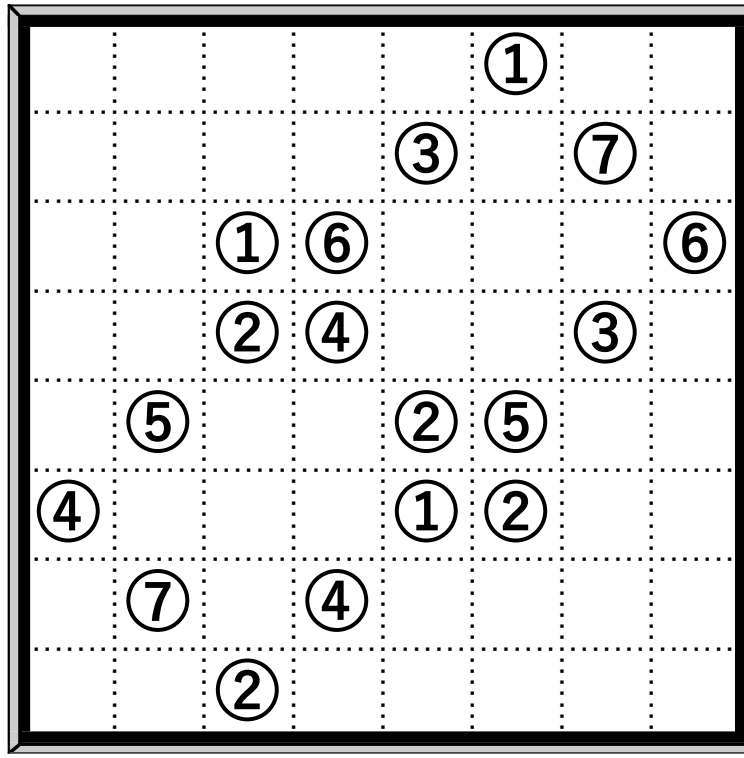

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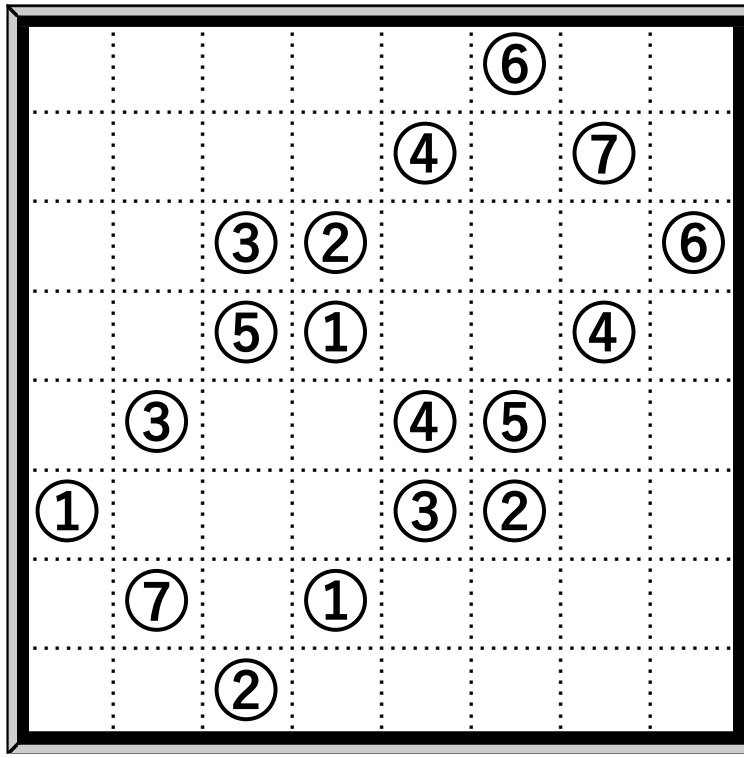

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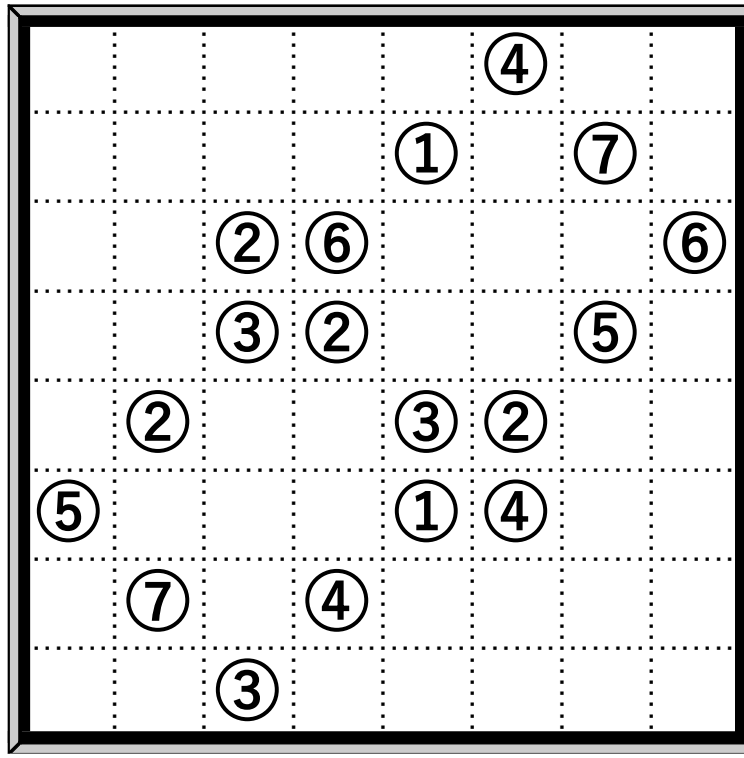
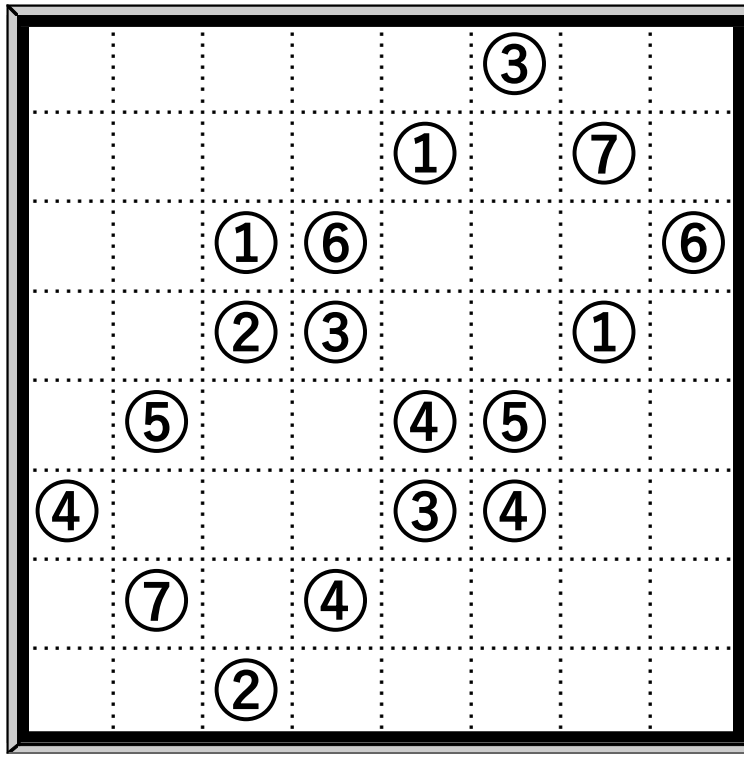
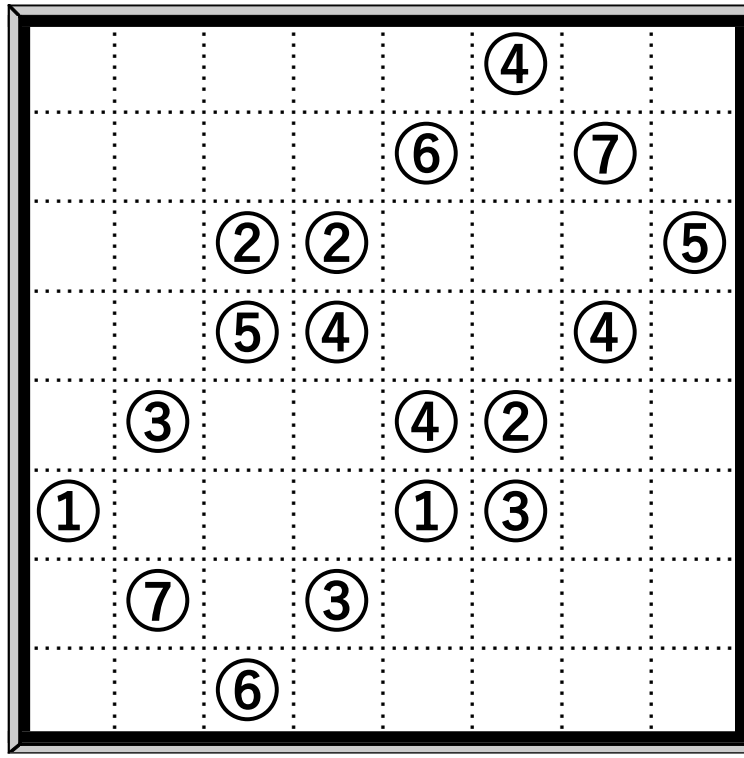


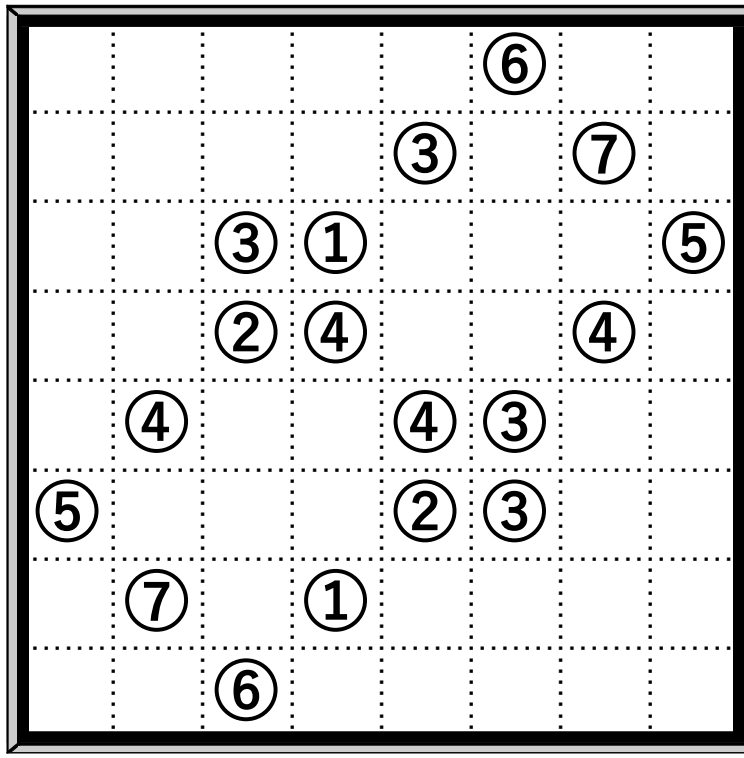
PUZZLE NO. 15



PUZZLE NO. 16



PUZZLE NO. 17



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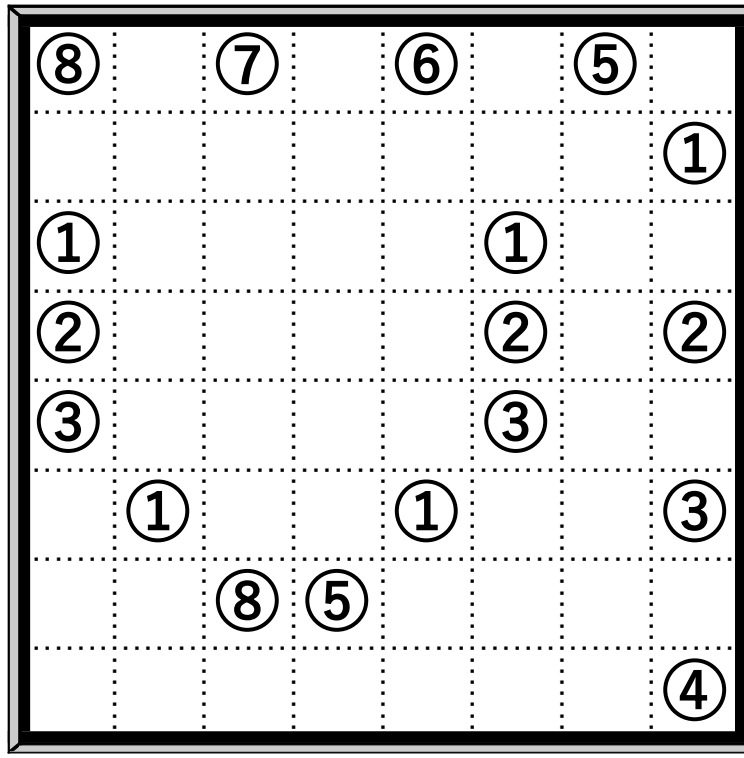

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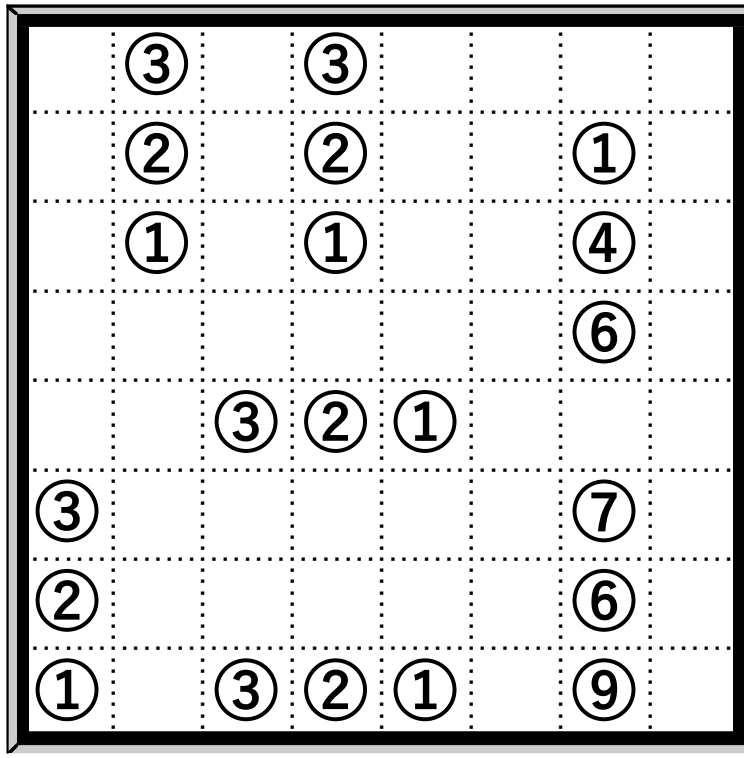
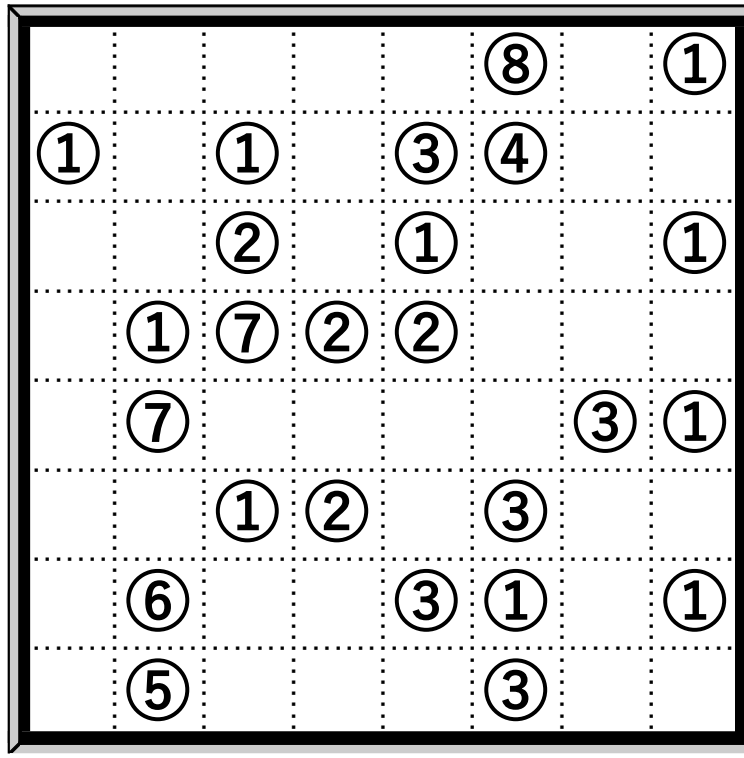


PUZZLE NO. 20



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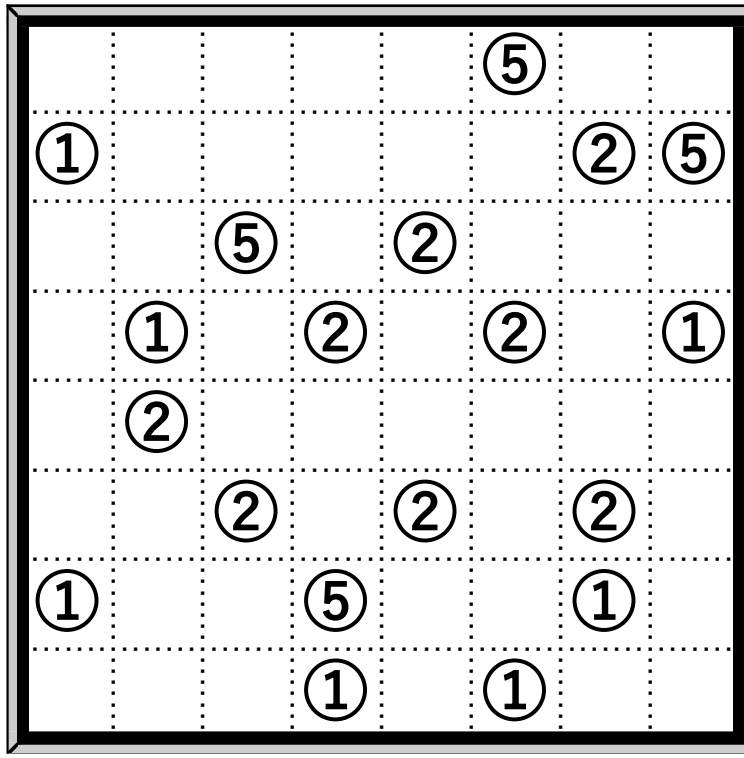
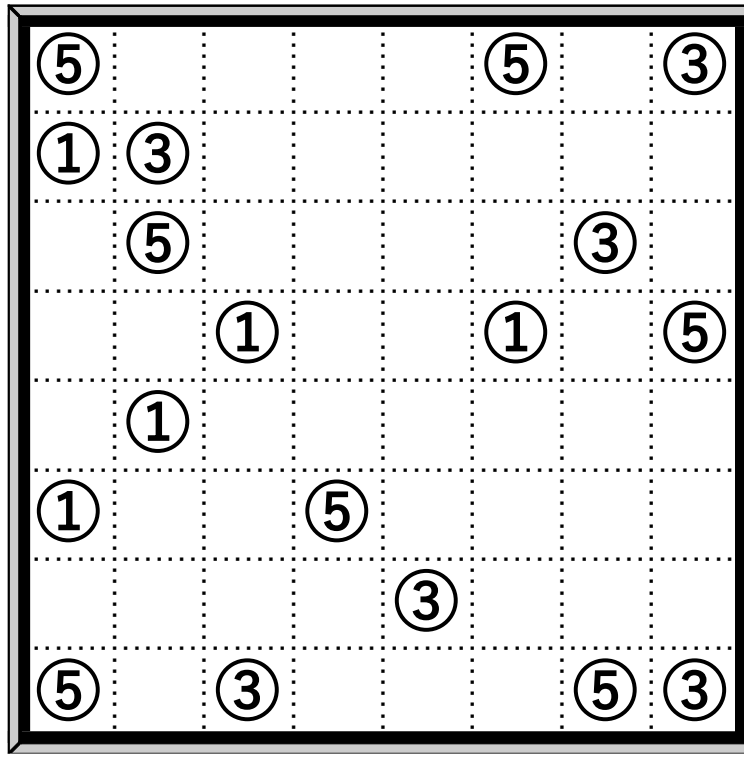


PUZZLE NO. 22



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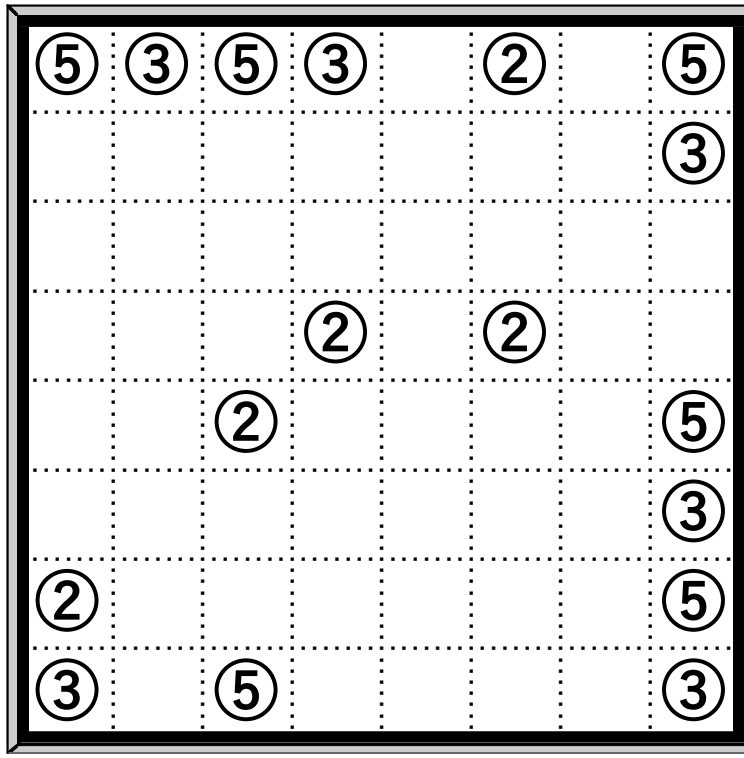

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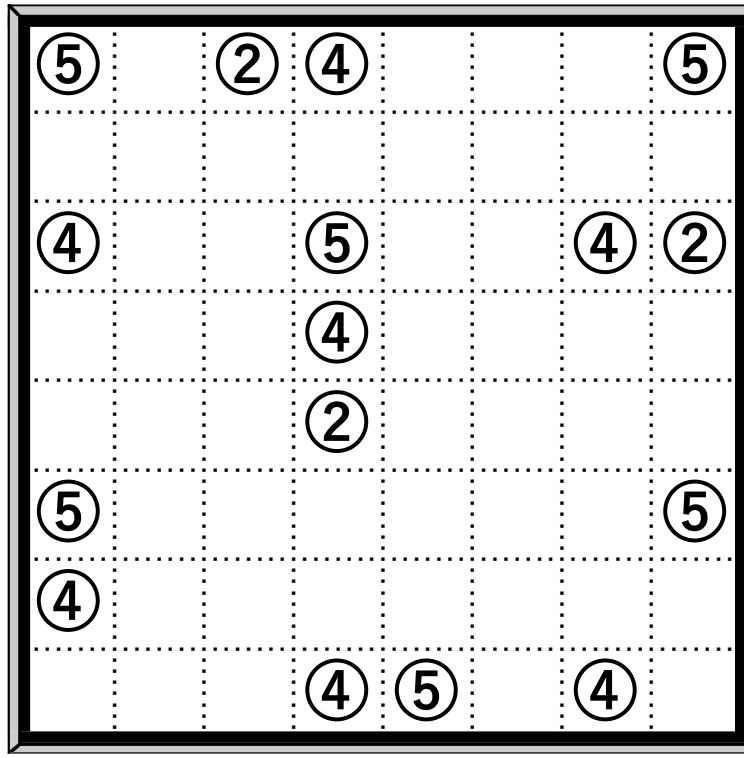

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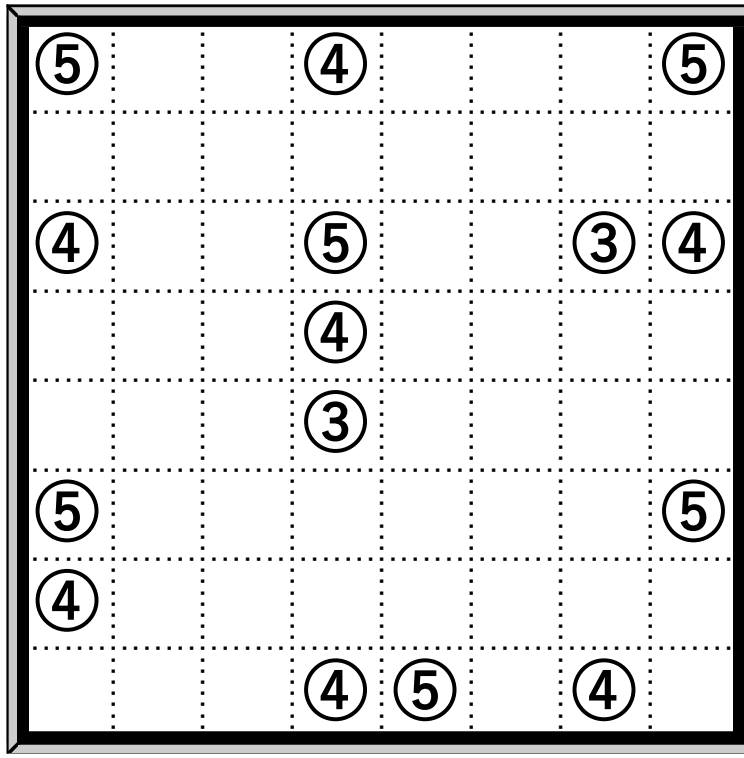

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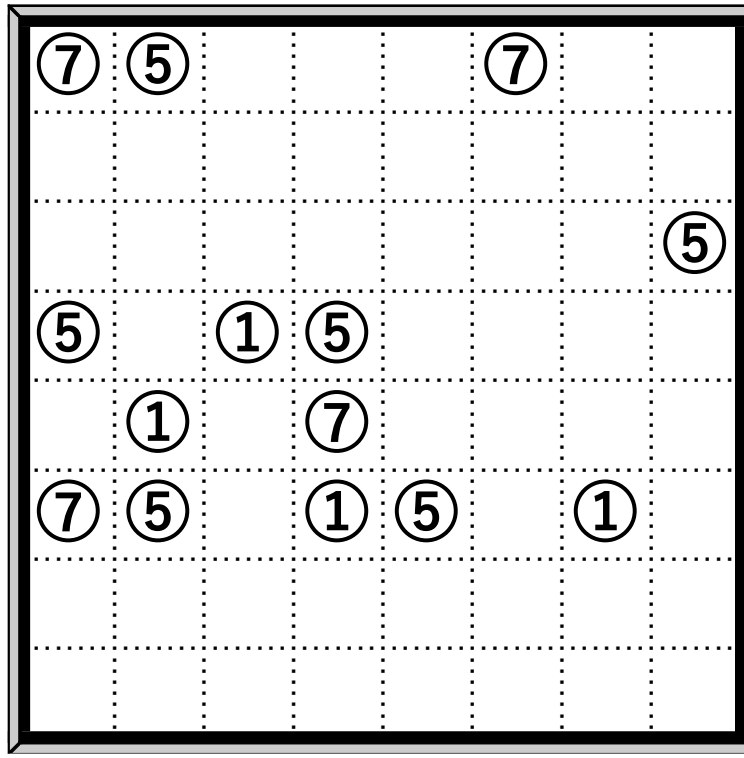

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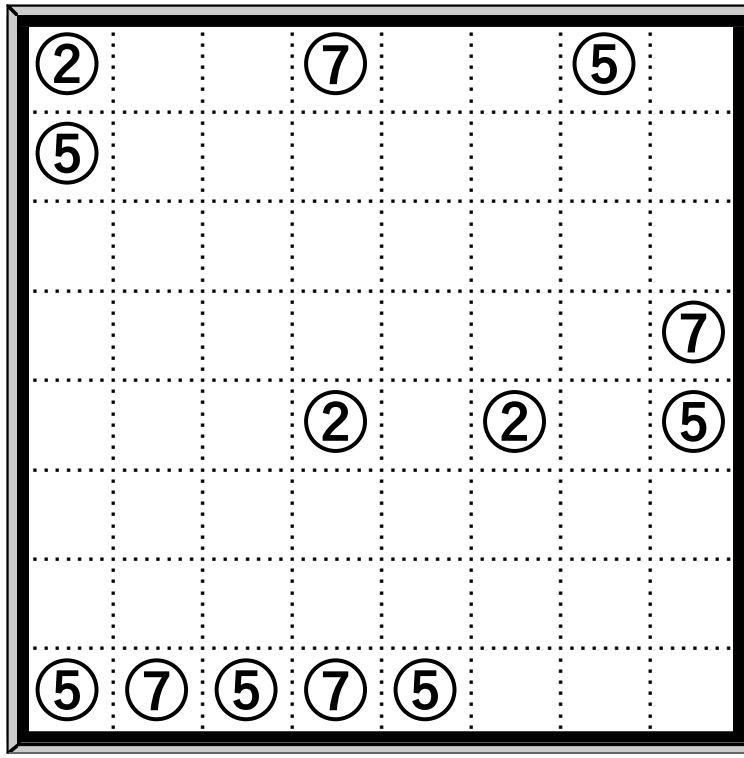
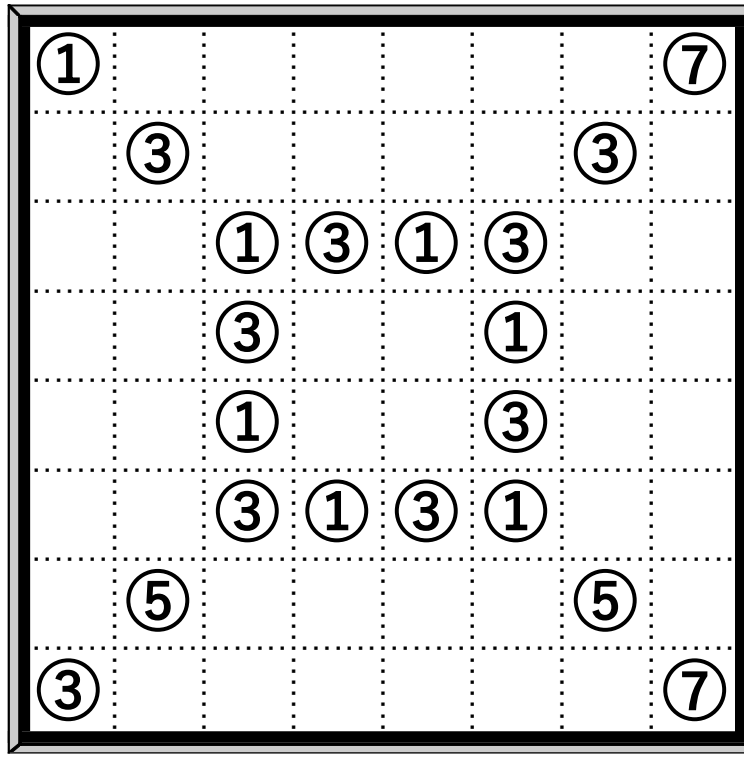


PUZZLE NO. 28



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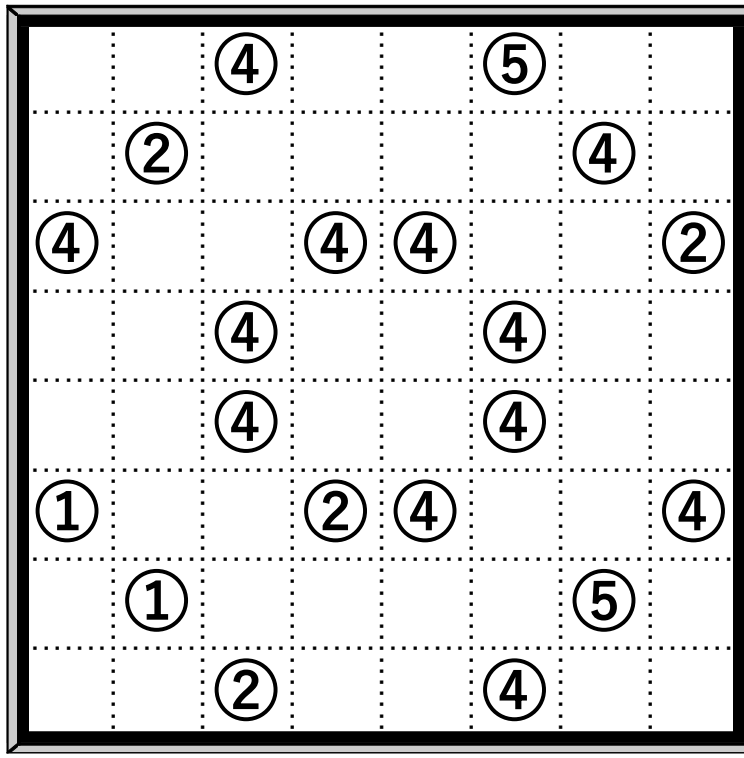

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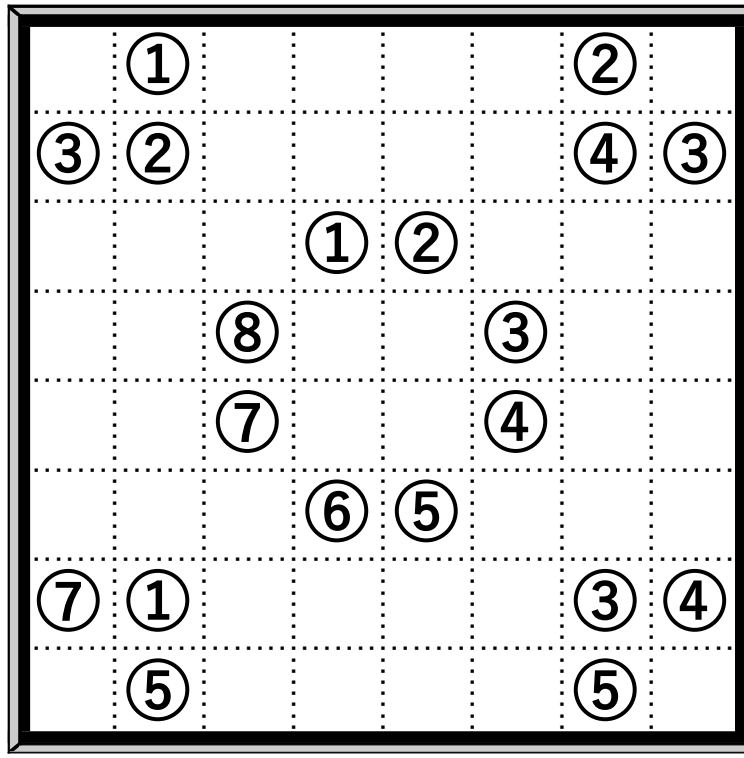

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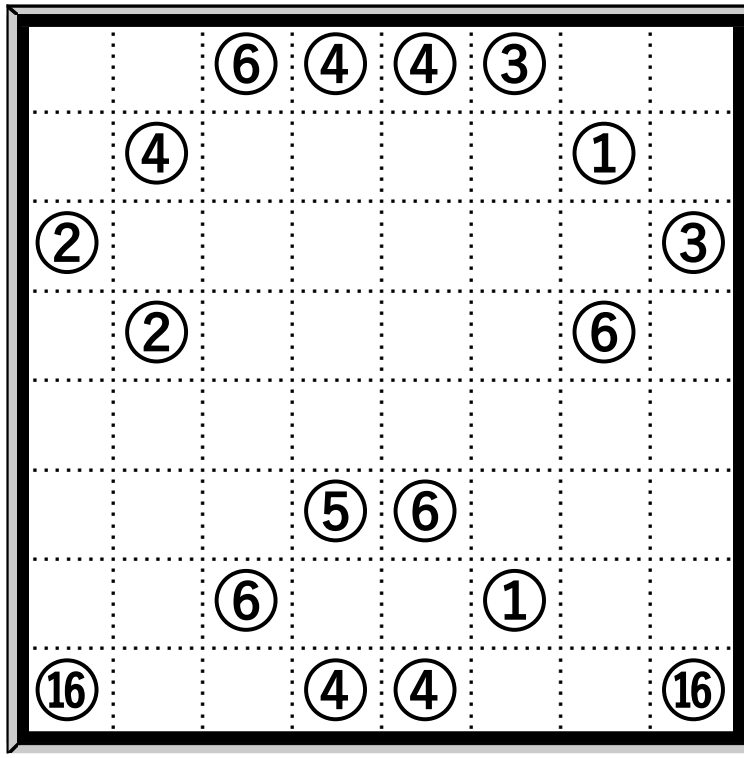

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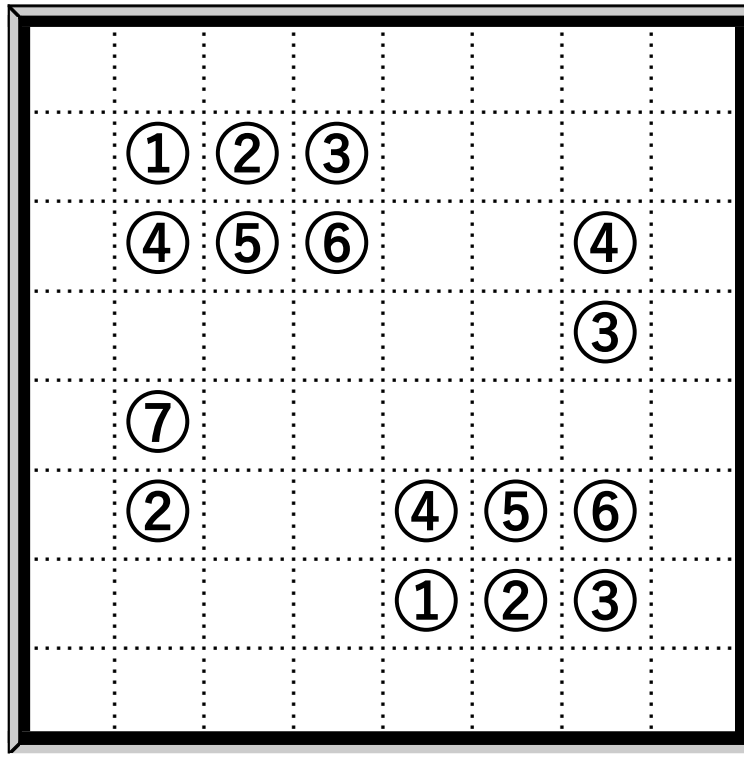

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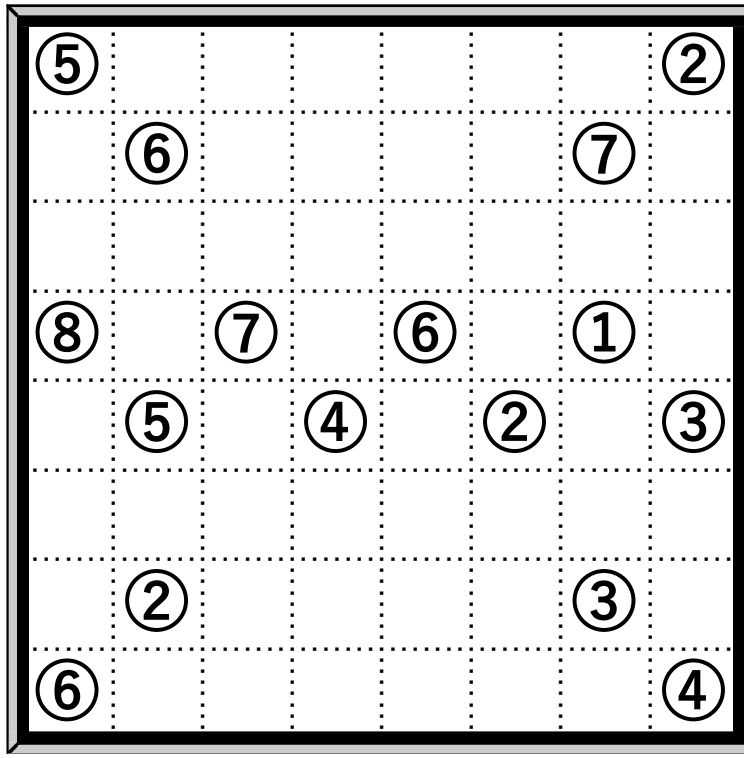

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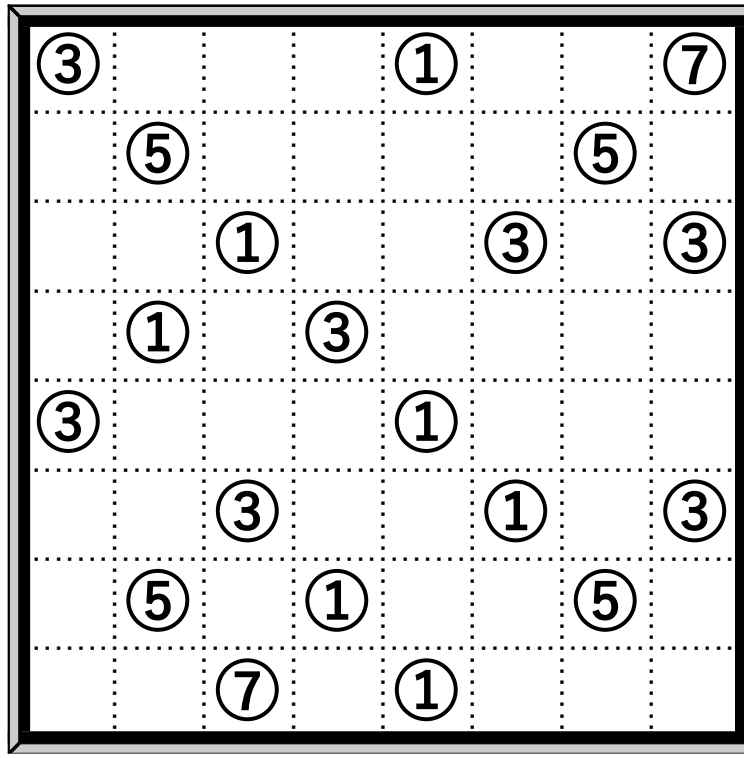
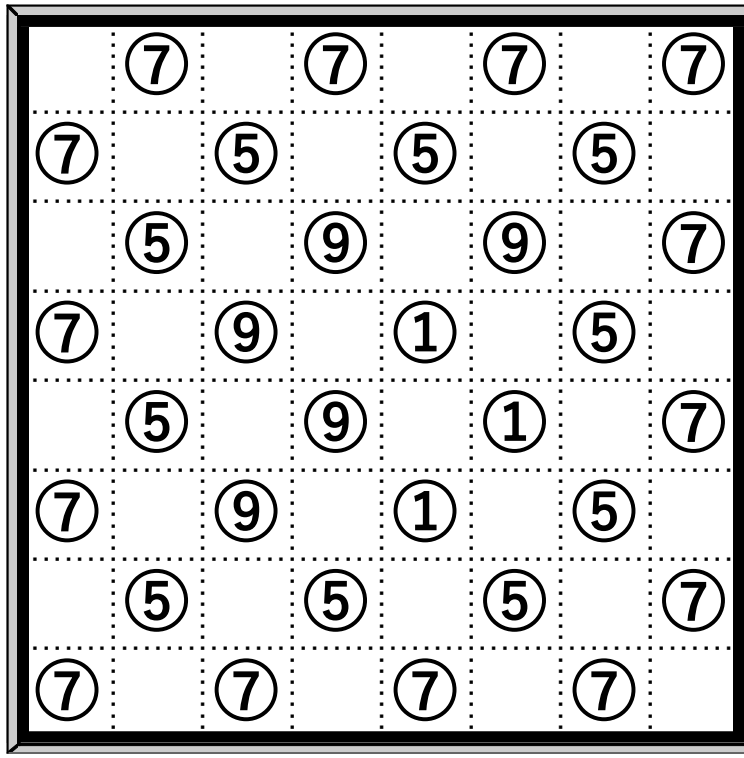


PUZZLE NO. 35



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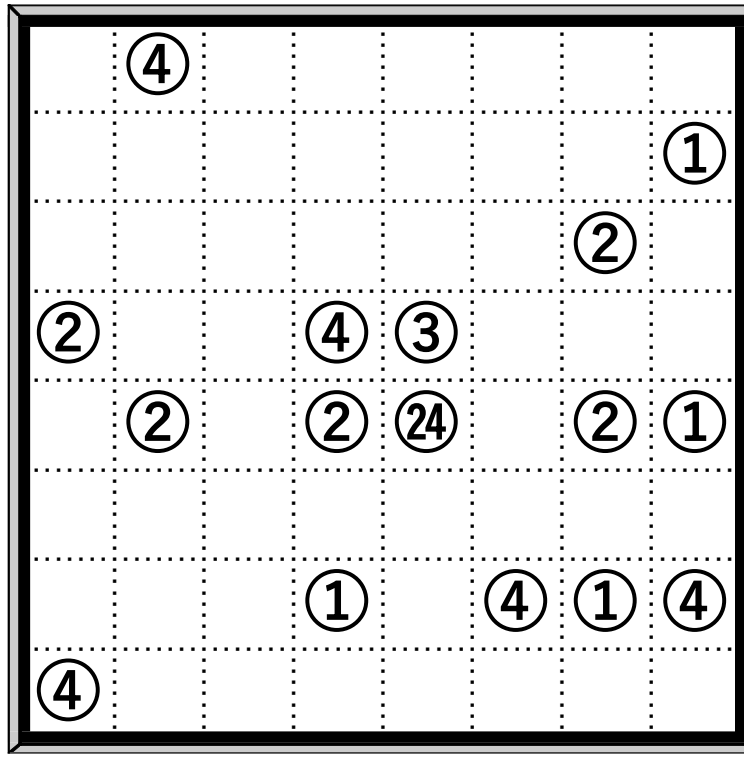

9 x 9 PUZZLES

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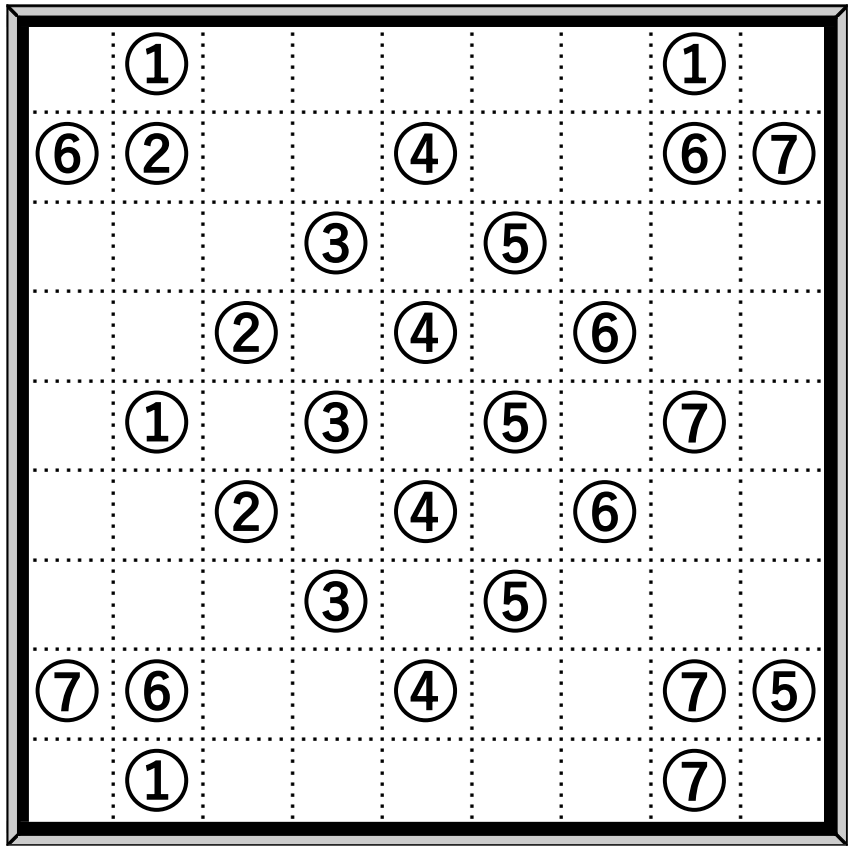
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36

PUZZLE NO. 1



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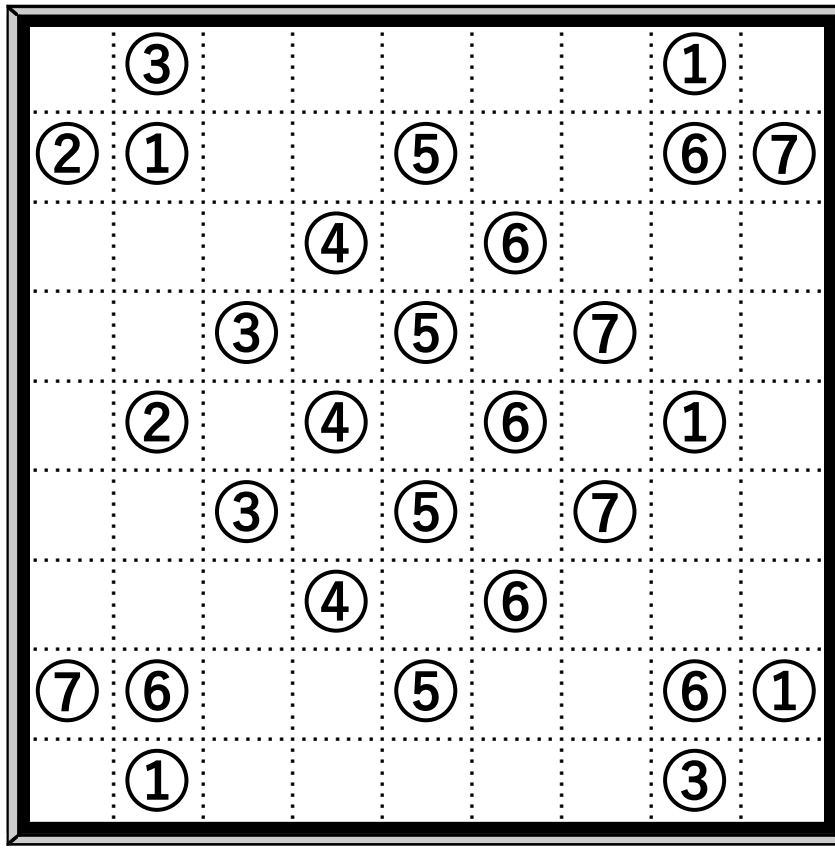

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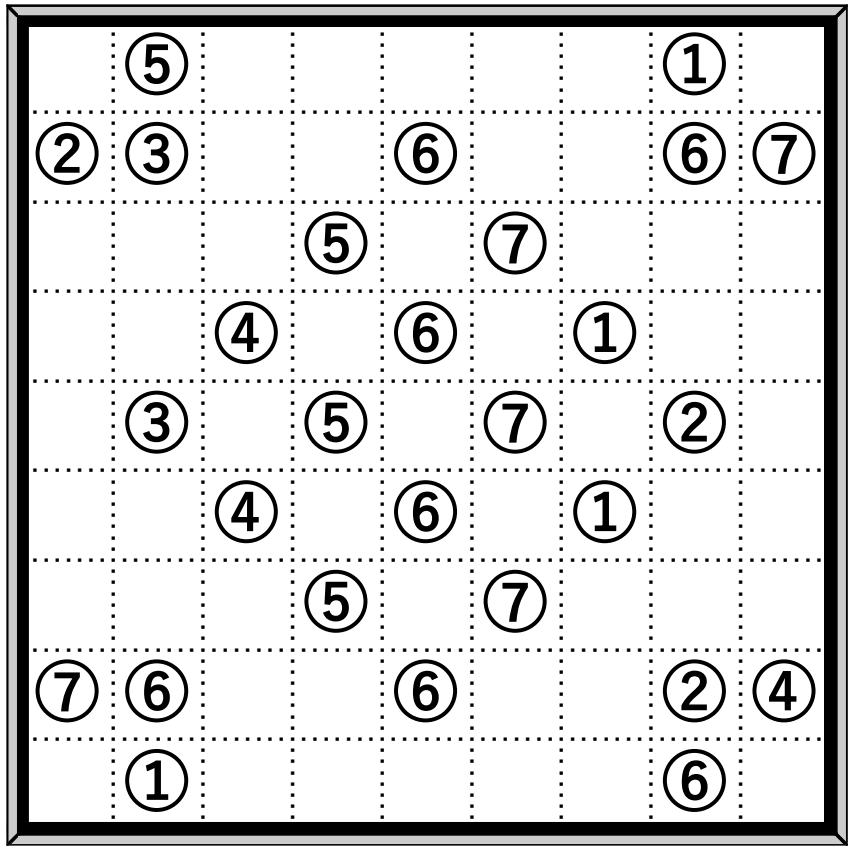

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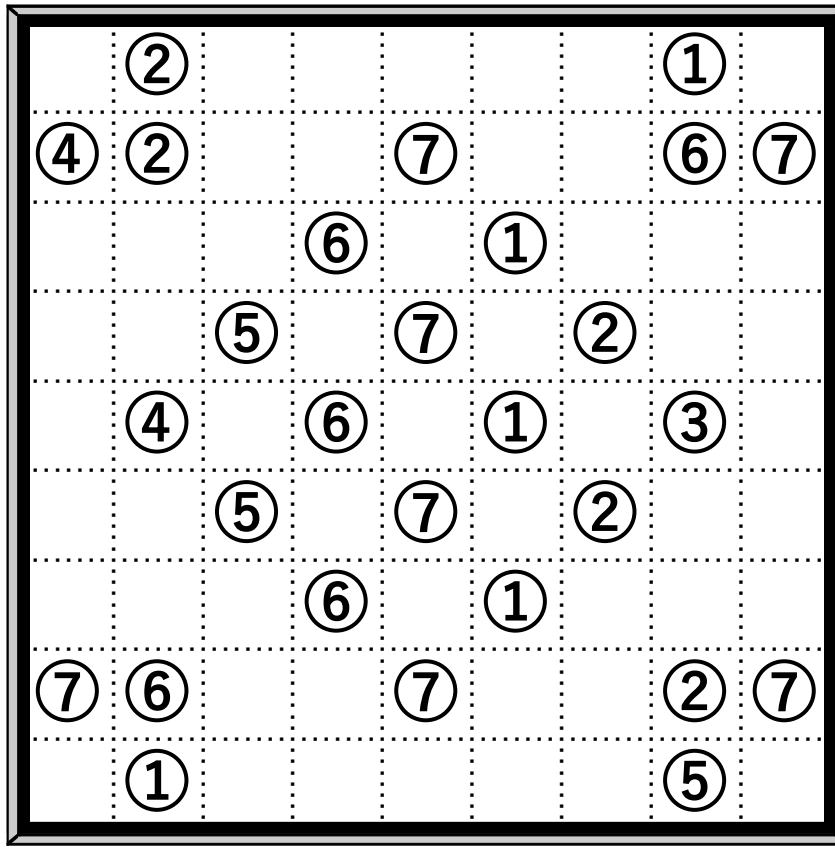

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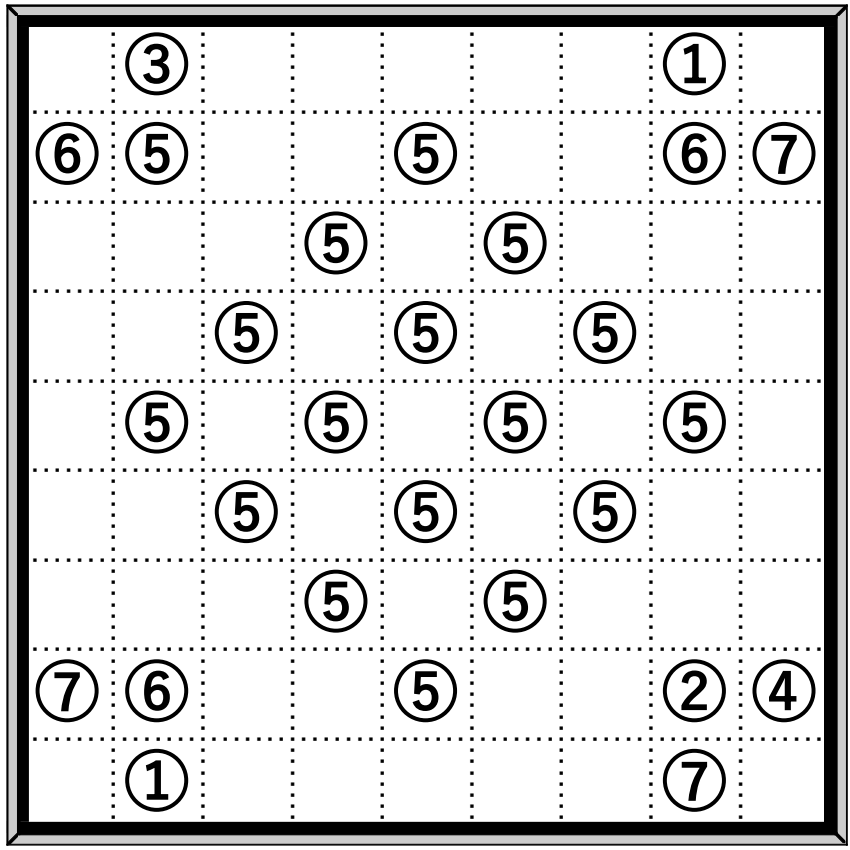

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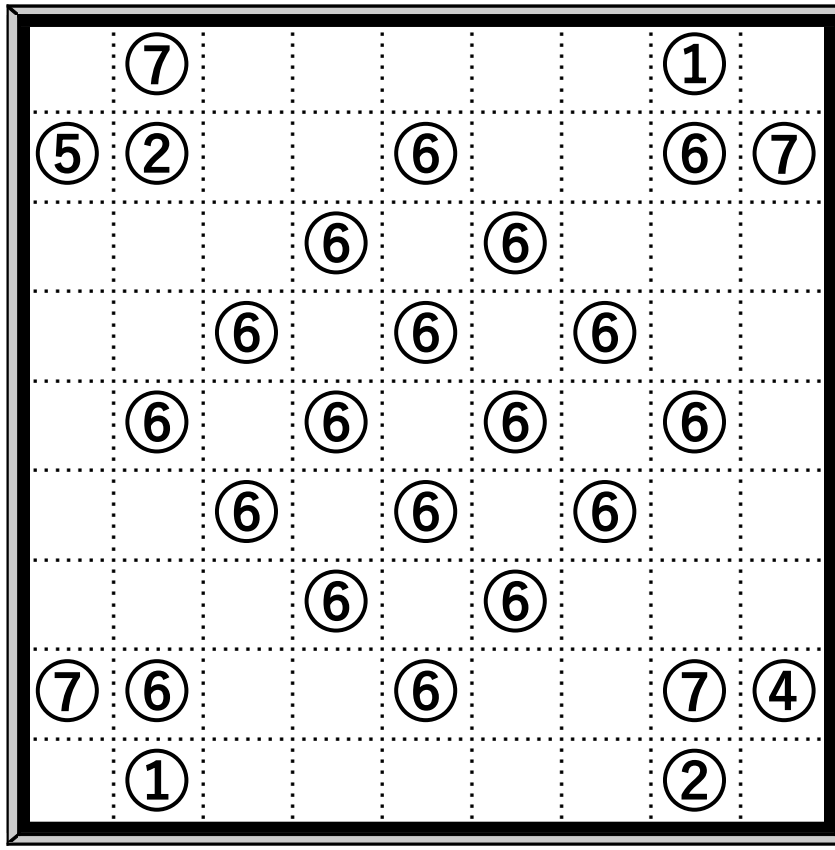

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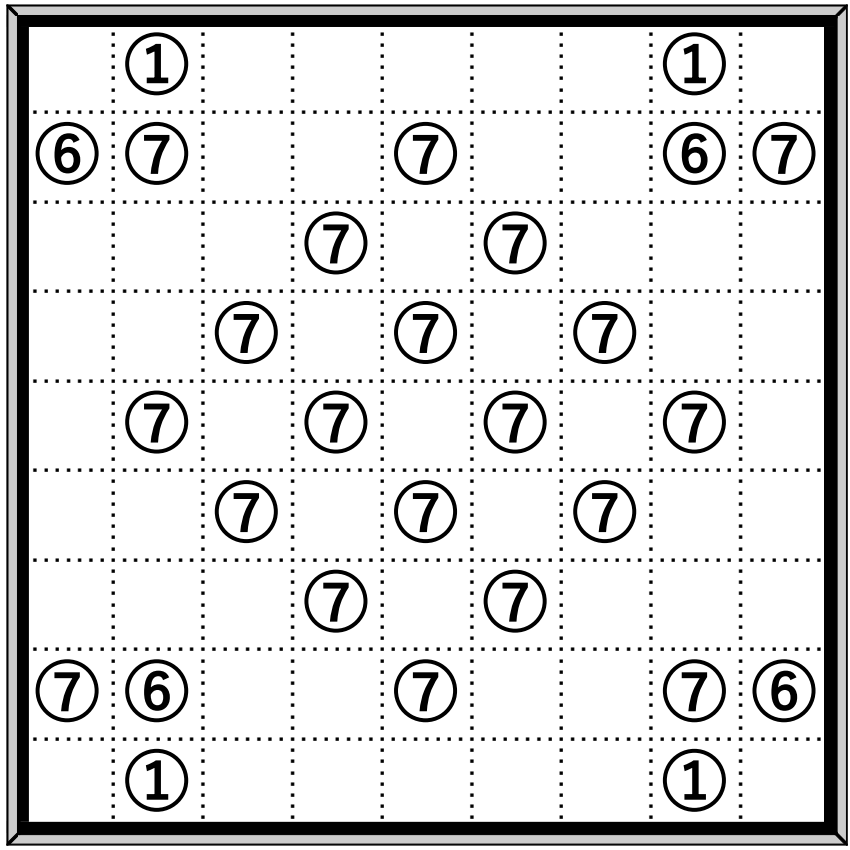
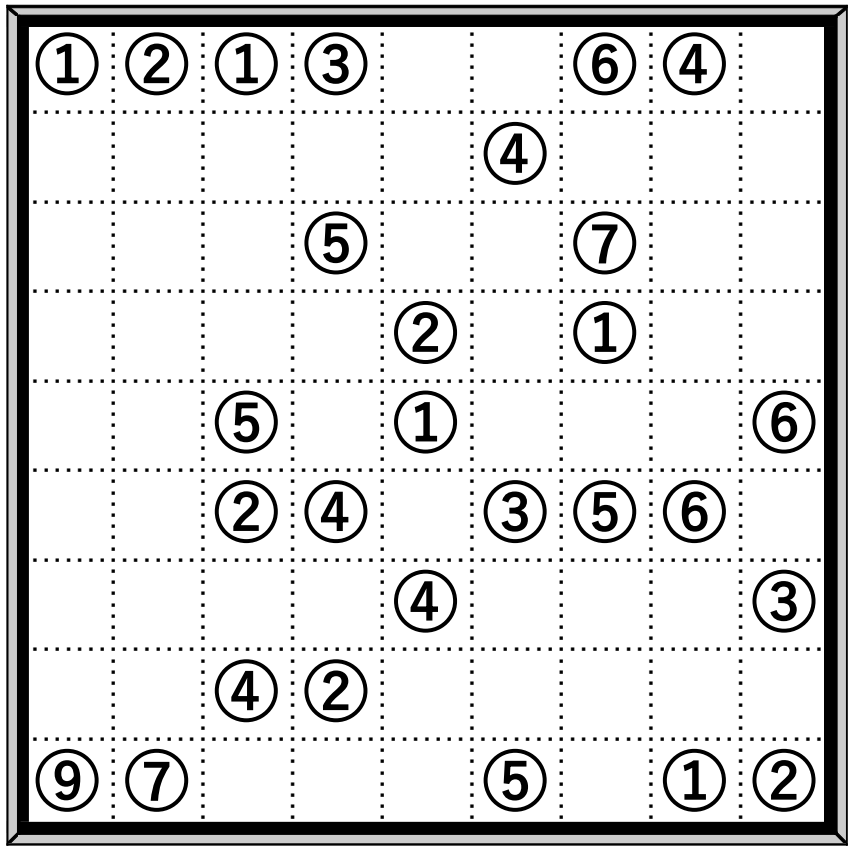


PUZZLE NO. 8

8	6					5	1	
6		8			5		7	
4		2			1		3	
2	4					7	3	
1	2				2	5	3	
4	3				1	6	4	

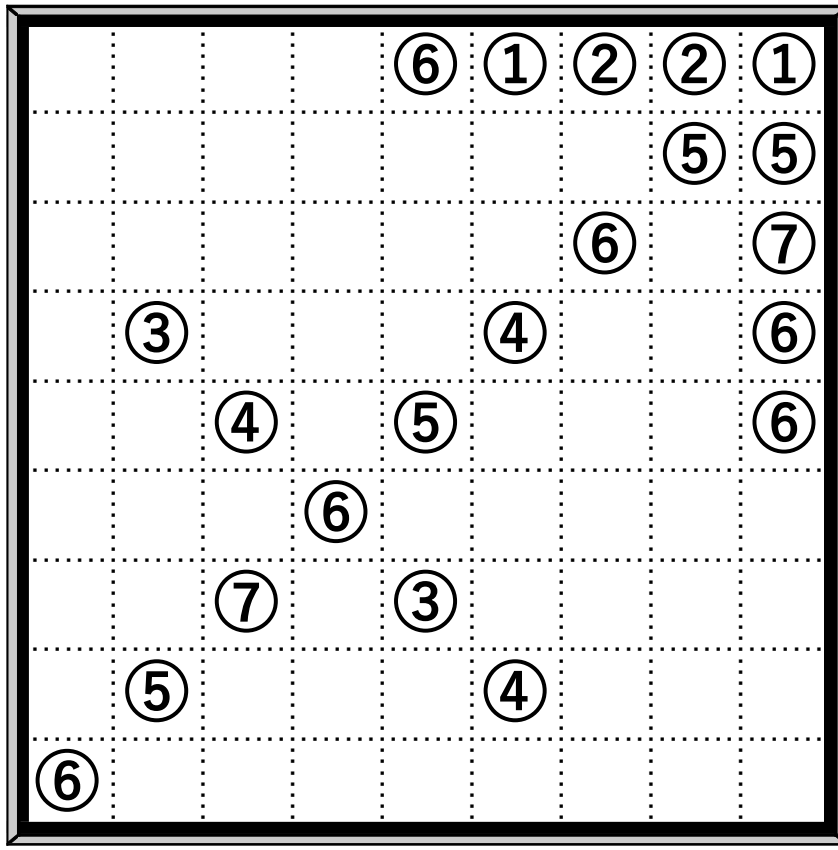
PUZZLE NO. 9



PUZZLE NO. 10

				6	1			3
		3	6	1				9
	2			5				7
	1		9					2
			1		3			
1	2			1				2
		8	1					
				4				2
		1	2	3		1		

PUZZLE NO. 11



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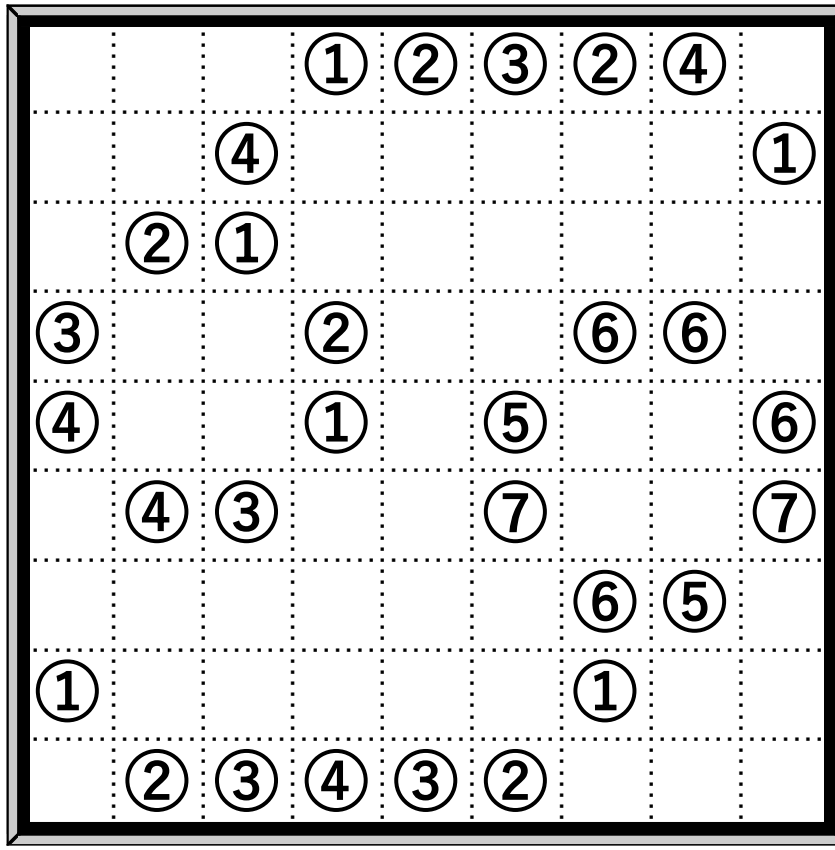

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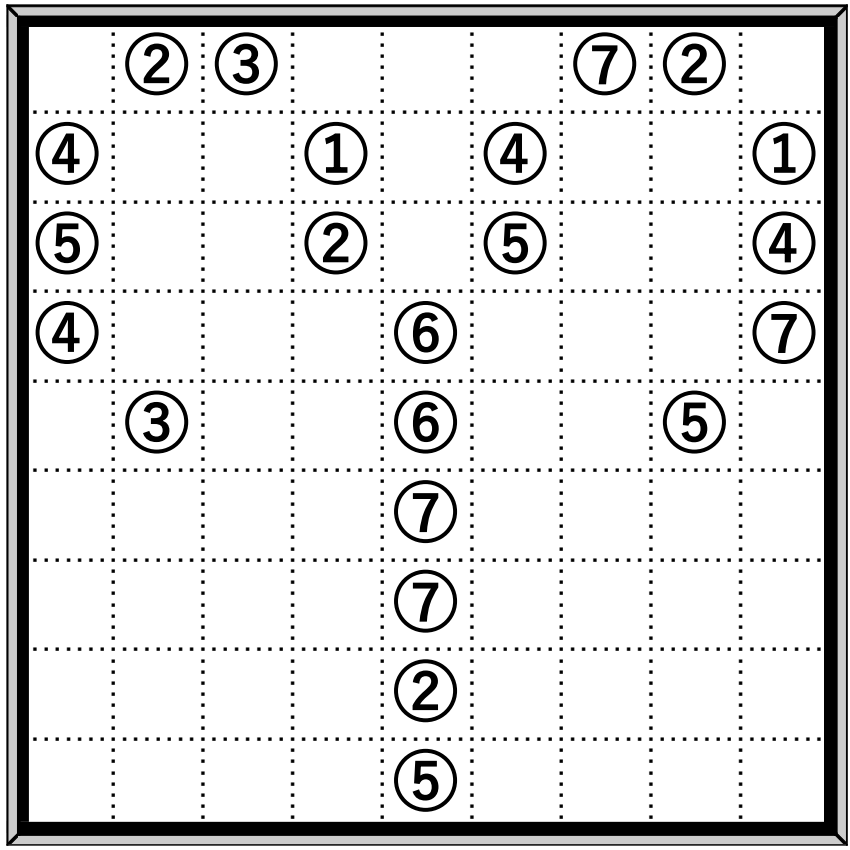

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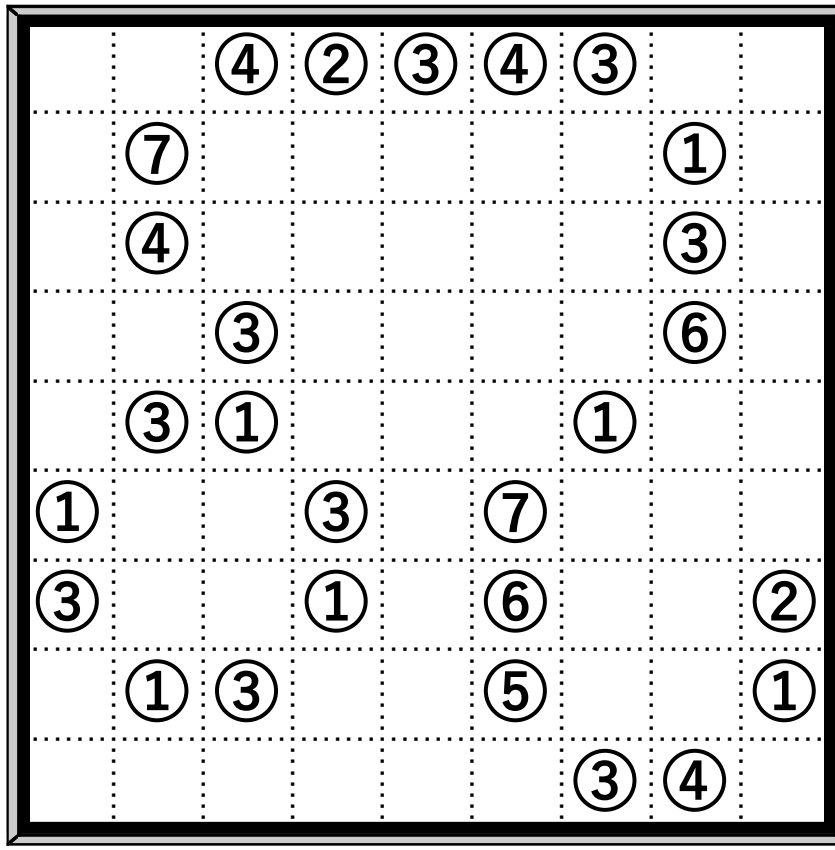

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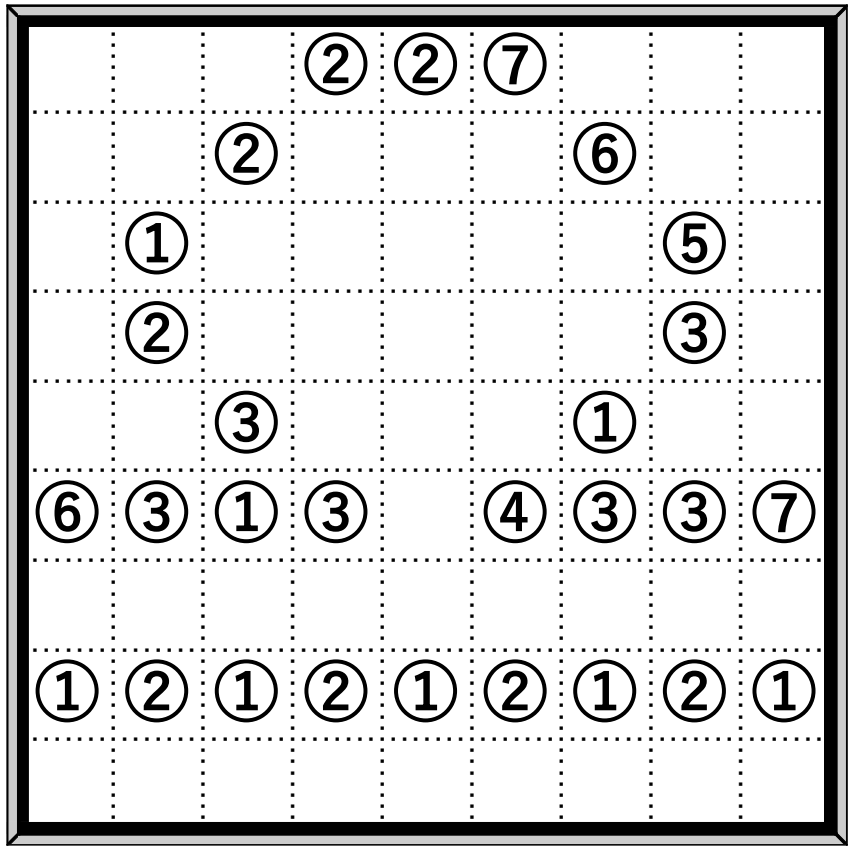

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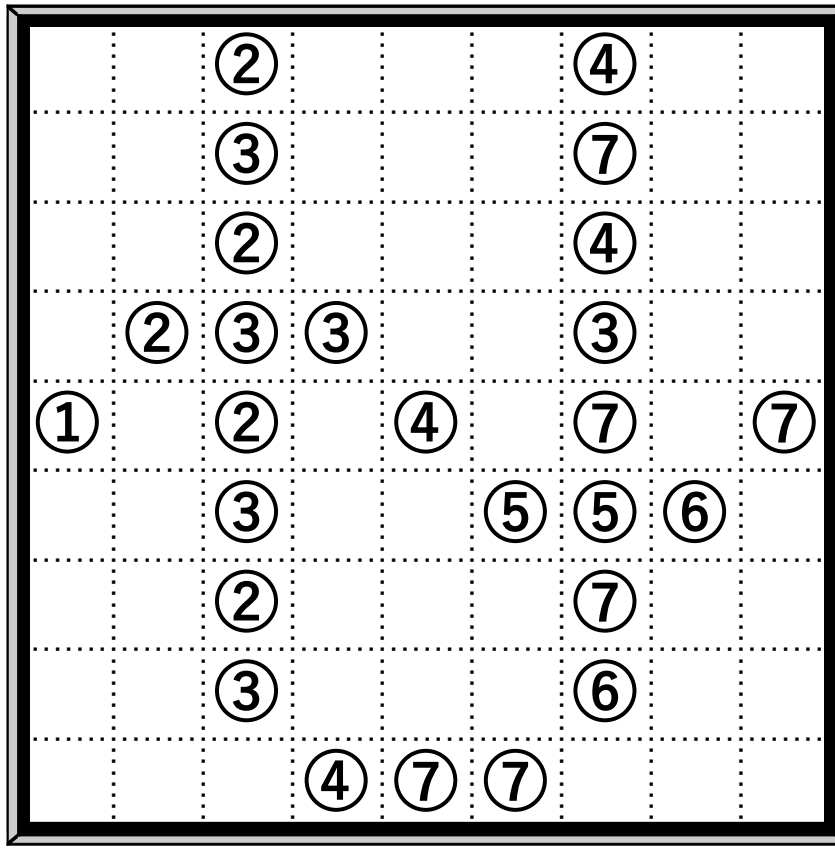

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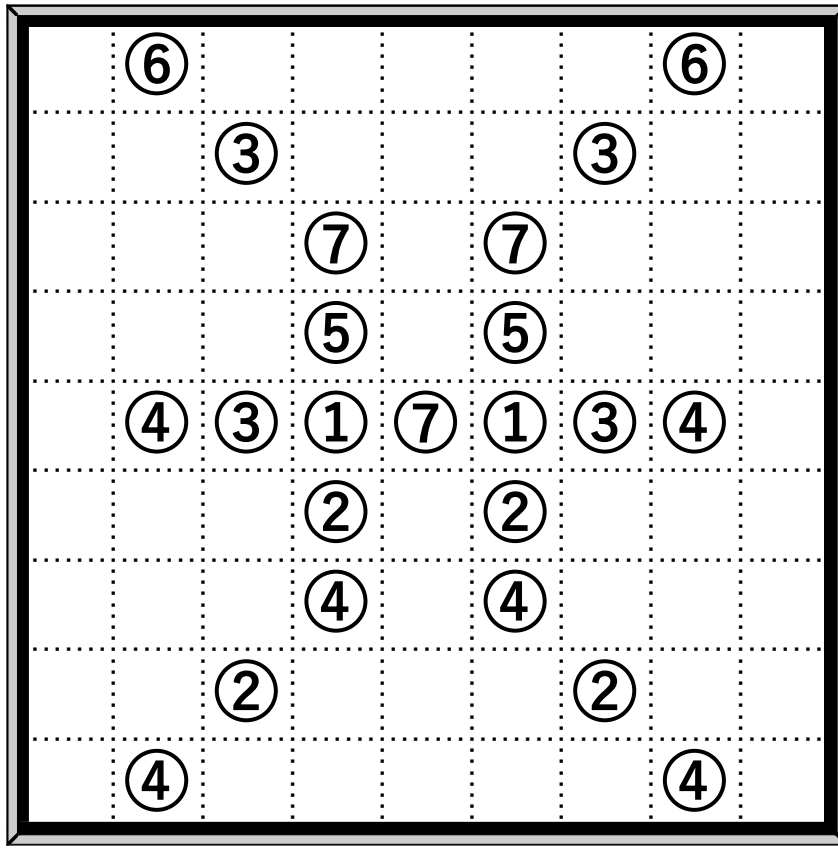

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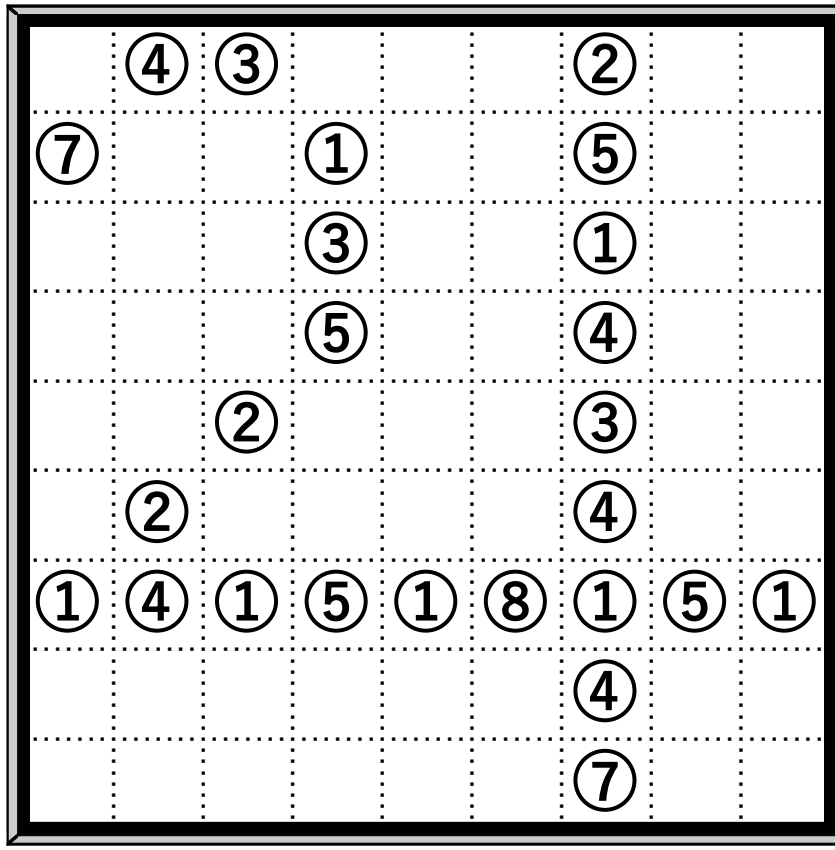
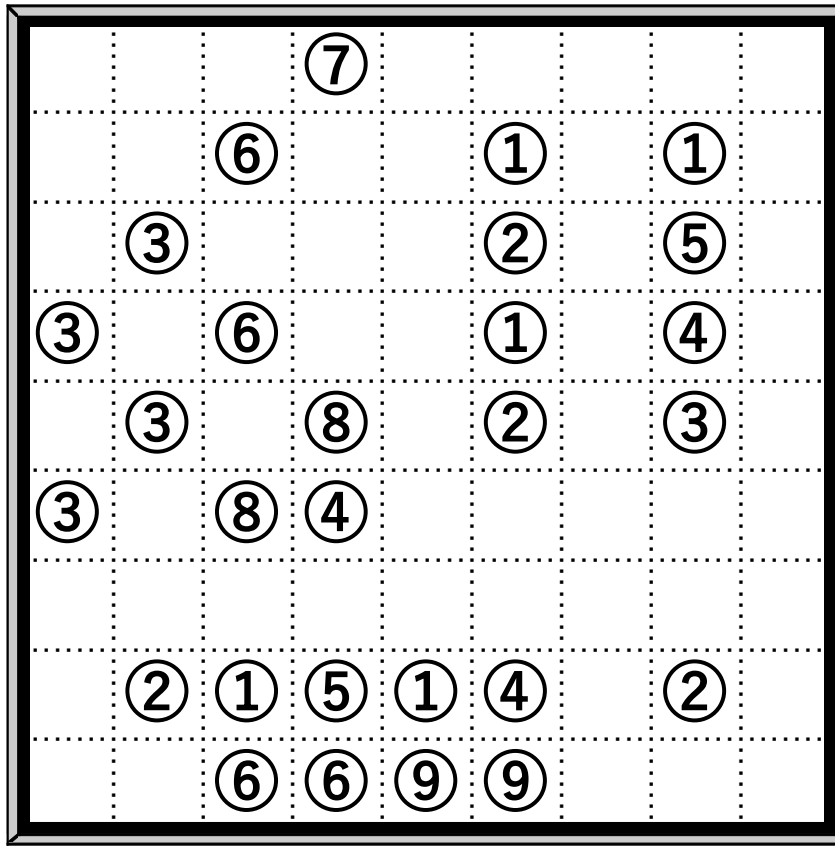


PUZZLE NO. 19

④				②	④		⑤	①
	④			①				②
④		④		③				④
	④			③				④
④				④				①
				③	①		④	③
④								⑨
⑤	⑤						⑤	①

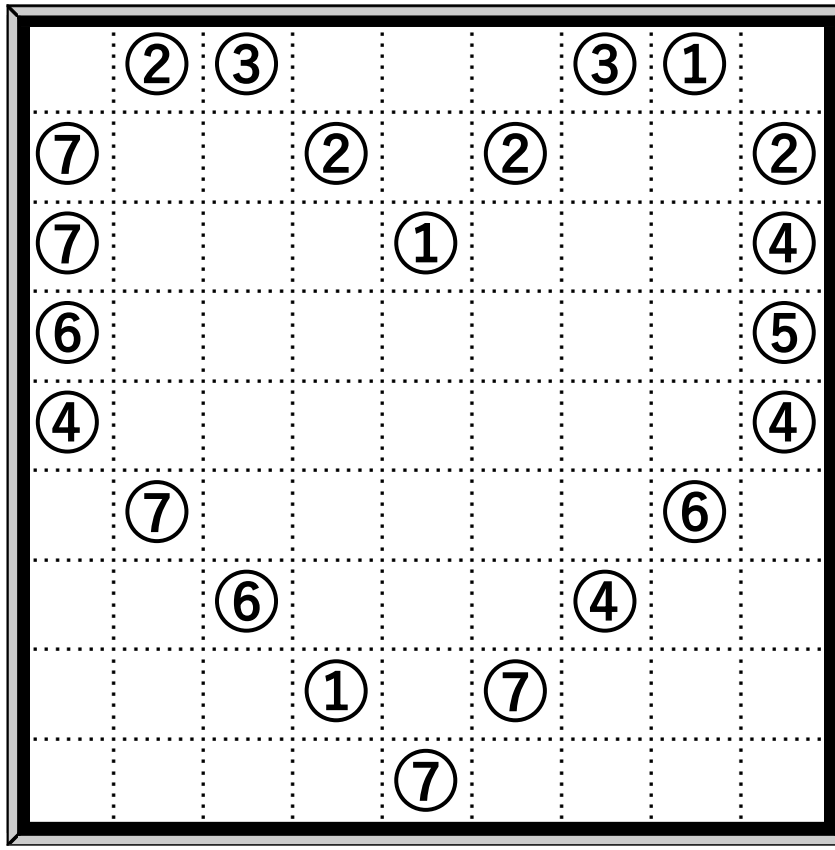
PUZZLE NO. 20



PUZZLE NO. 21

②	②	⑥	③			②	①	③
①				④		④		
②				④		④		
①	⑥	⑥	③			①	③	③
②						②		①
①						④		②
②						②	⑤	⑦
③	④	④	②					

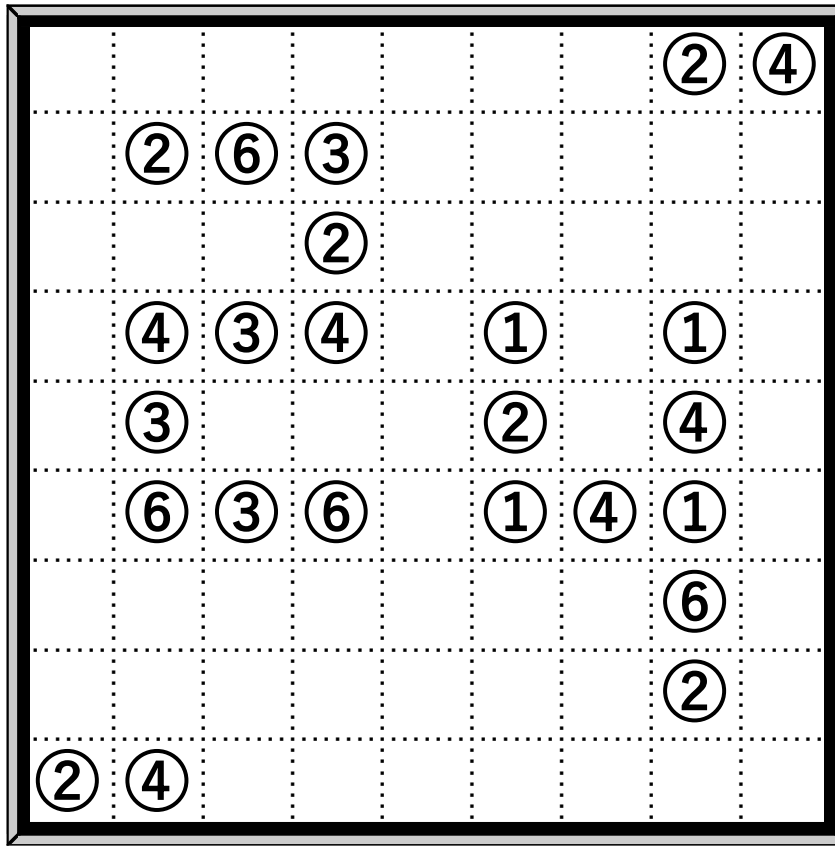
PUZZLE NO. 22



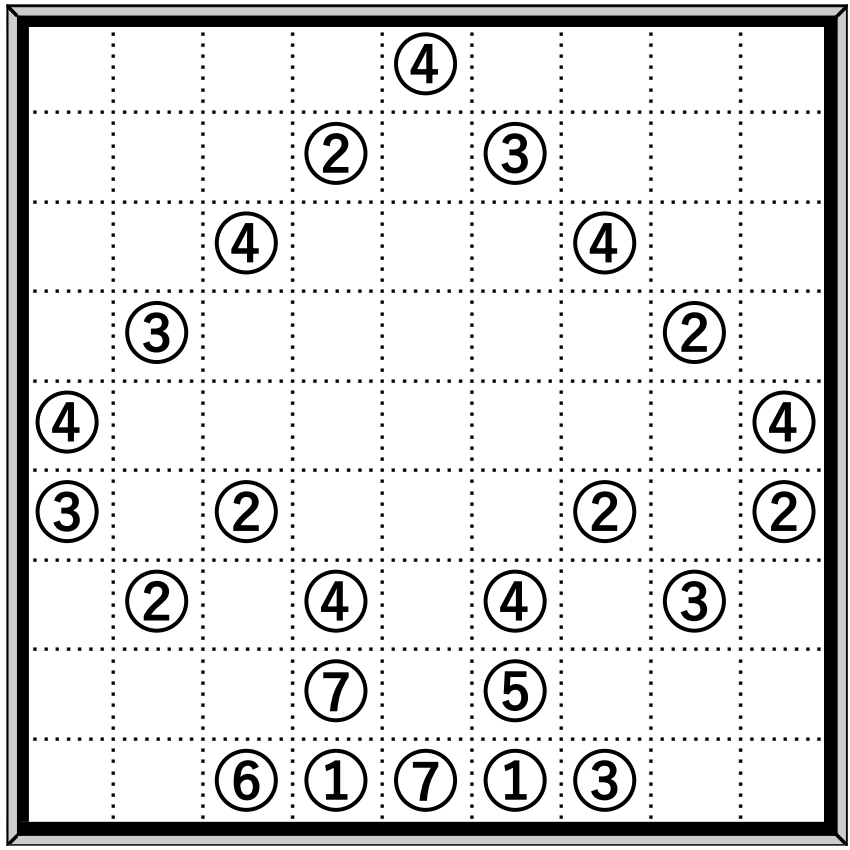
PUZZLE NO. 23

⑤	②	②	①		③	②	②	①
⑤					④			④
③					⑤	⑤	⑥	⑥
④					②			①
⑦	⑥	⑤	①		④			④
				⑥				
			①	⑥	④			
				⑥				

PUZZLE NO. 24



PUZZLE NO. 25



PUZZLE NO. 26

②				⑥		⑦	②	⑤
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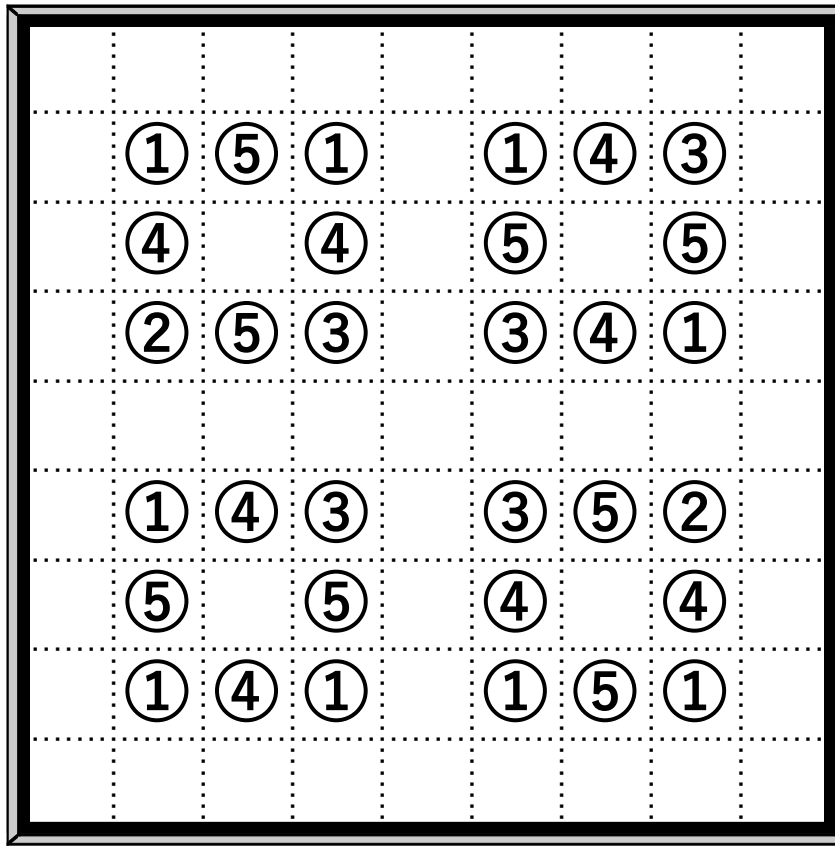
②		①		⑥		⑤		
⑥				⑥		①	③	①
②				②				③
⑥				⑥				②
②				④		②	③	⑦
③	④	④						

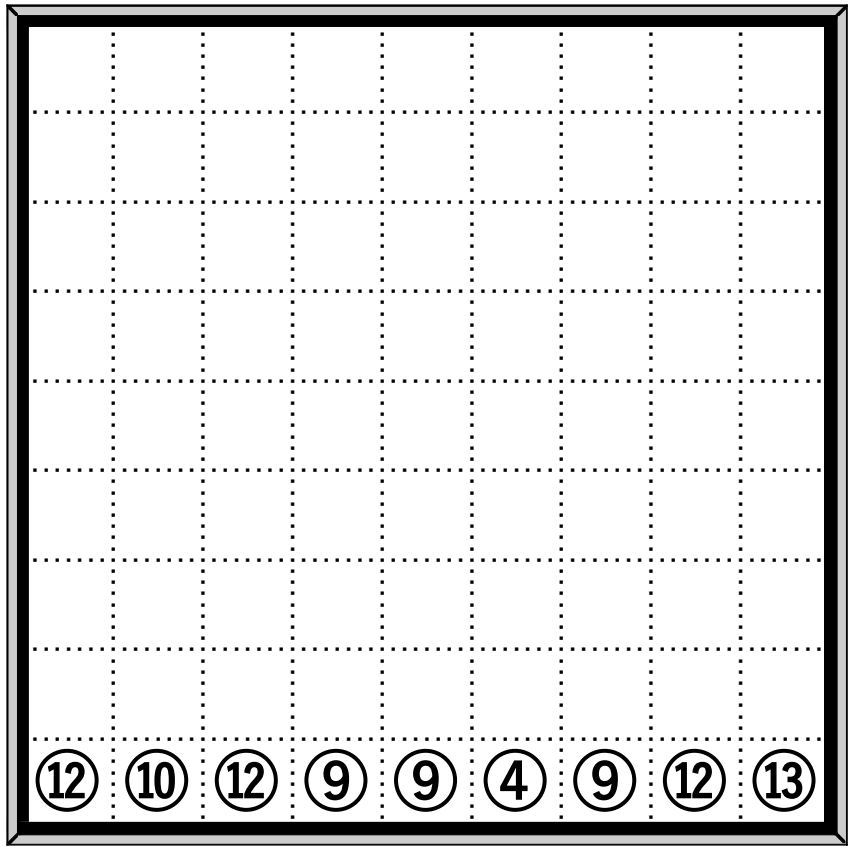
PUZZLE NO. 27

①	③	③	②	②	⑥			
②			④					
②	①	②	④	⑤	⑥			
③			⑤					
①	②	②	①	④	④			
④			⑦					
①	③	④	⑦	③	④	②	⑦	⑥
								①
①		②		③		④		⑦

PUZZLE NO. 28



PUZZLE NO. 29



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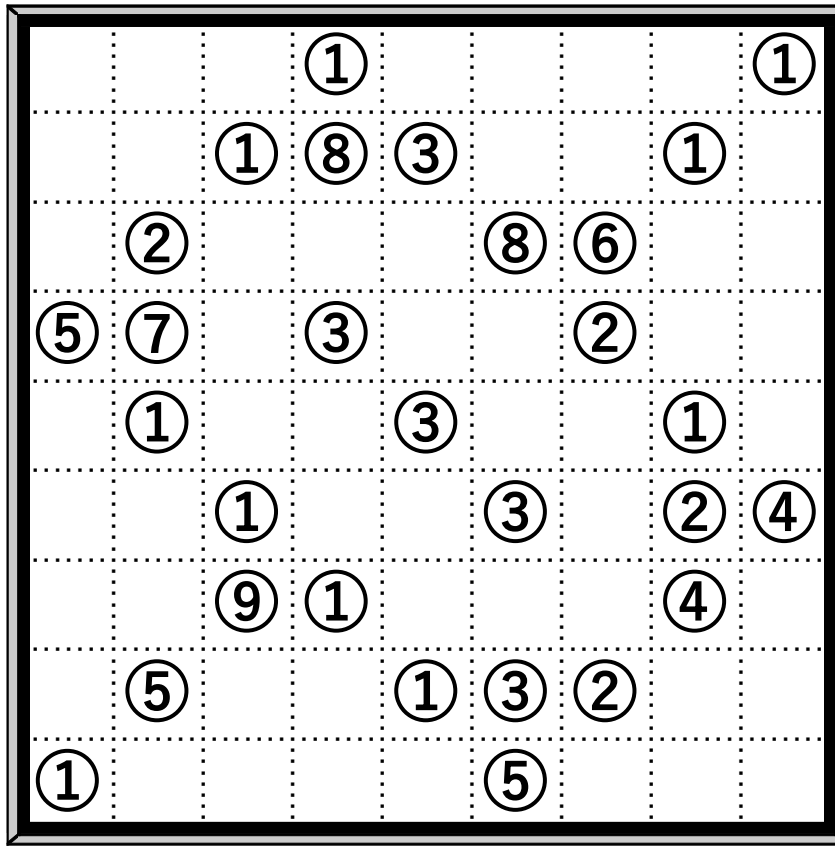

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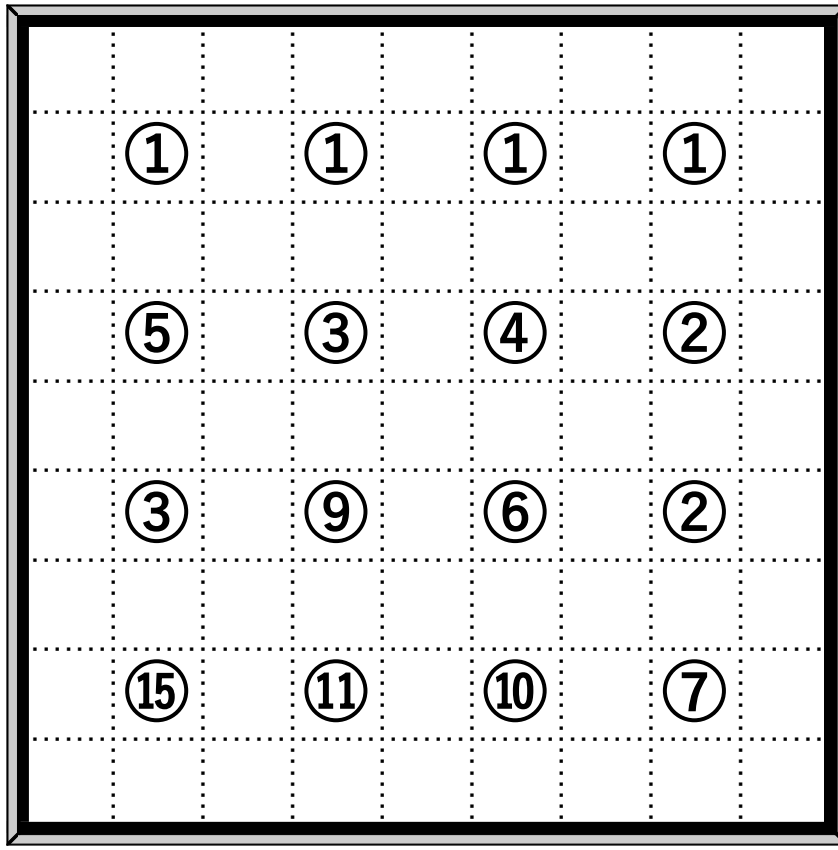
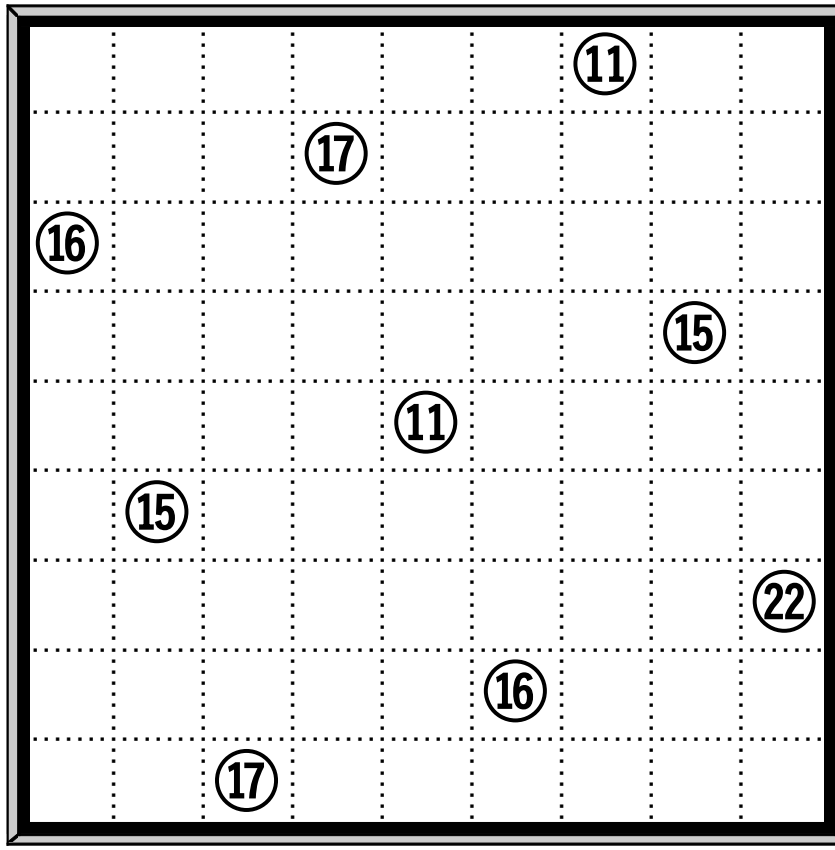
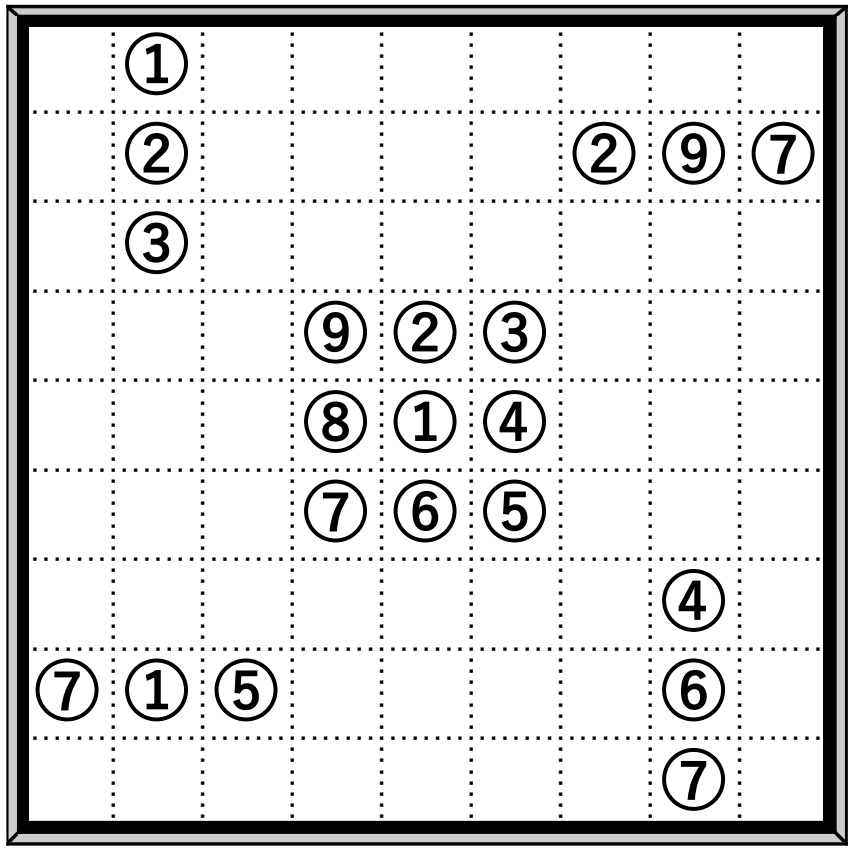


PUZZLE NO. 32



PUZZLE NO. 33



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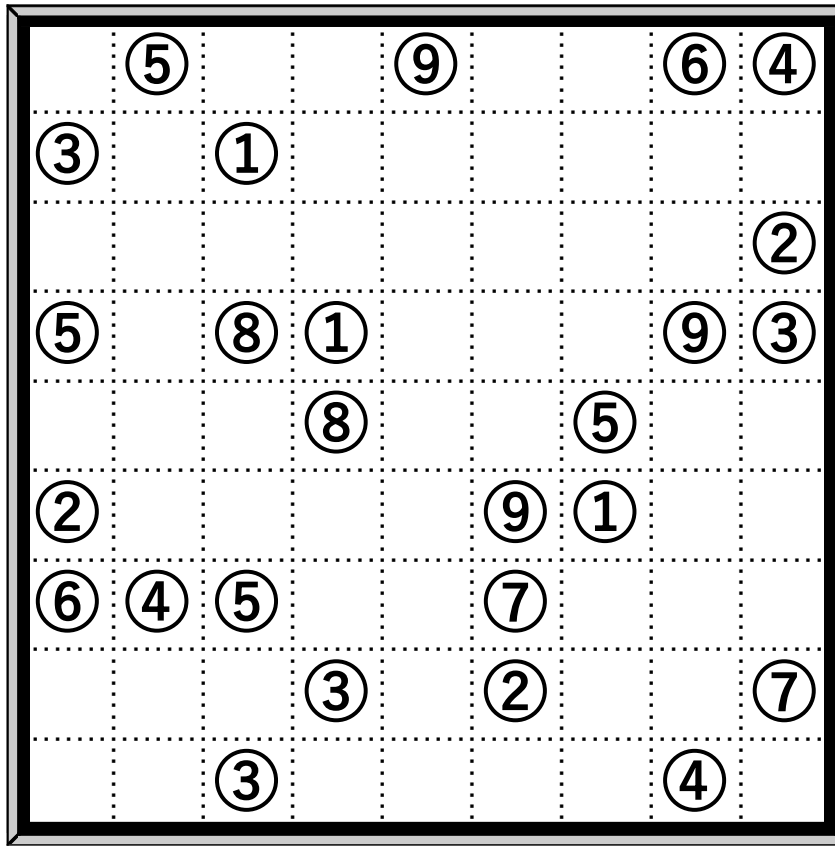

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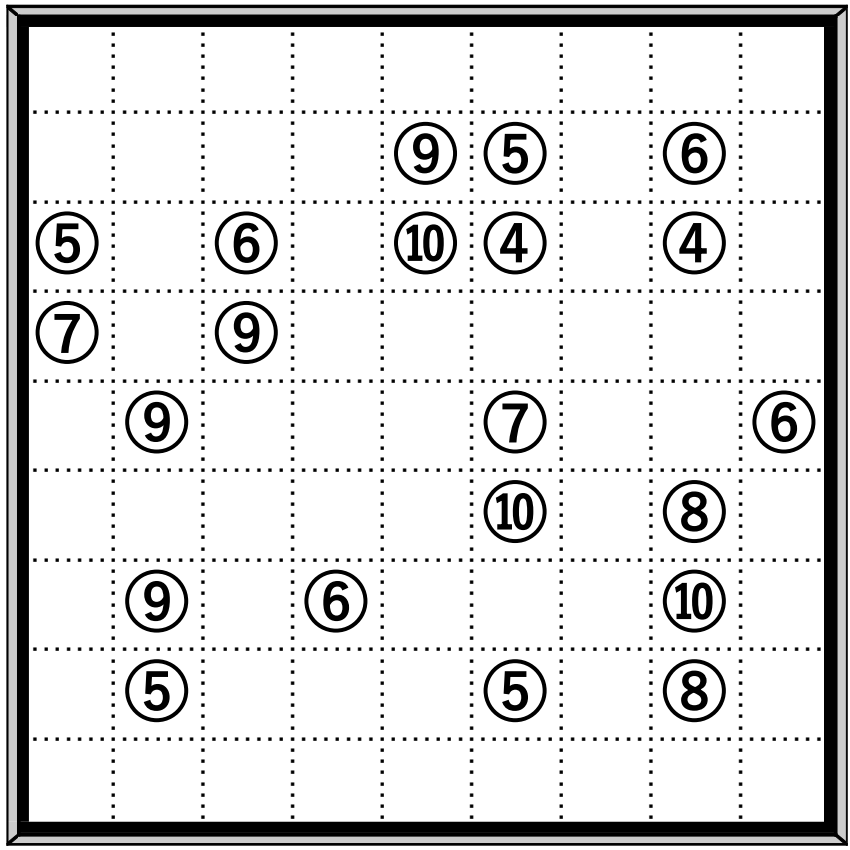
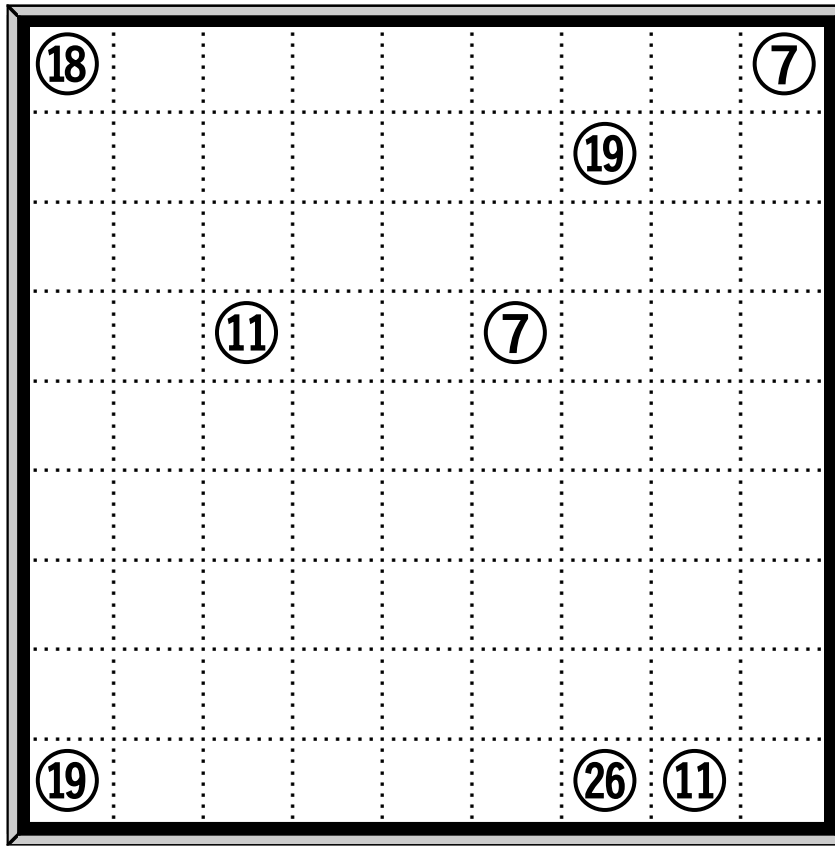


PUZZLE NO. 36



9 x 12 PUZZLES

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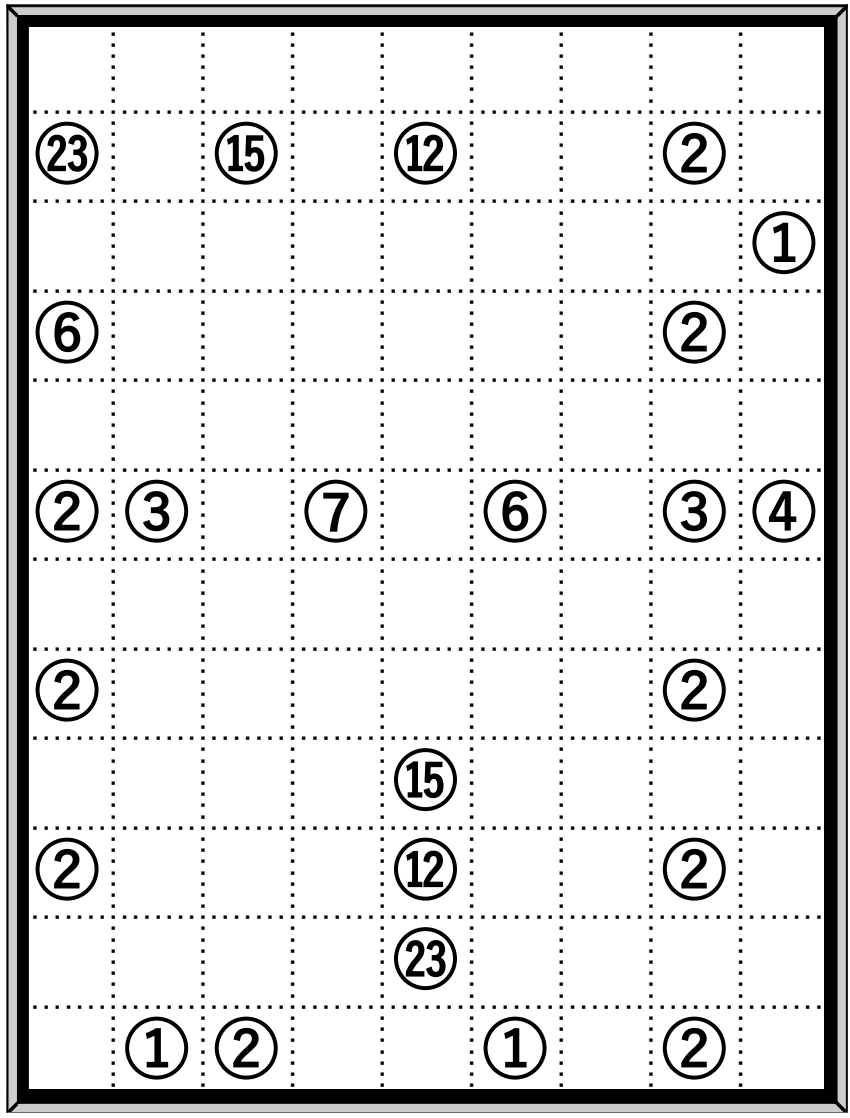
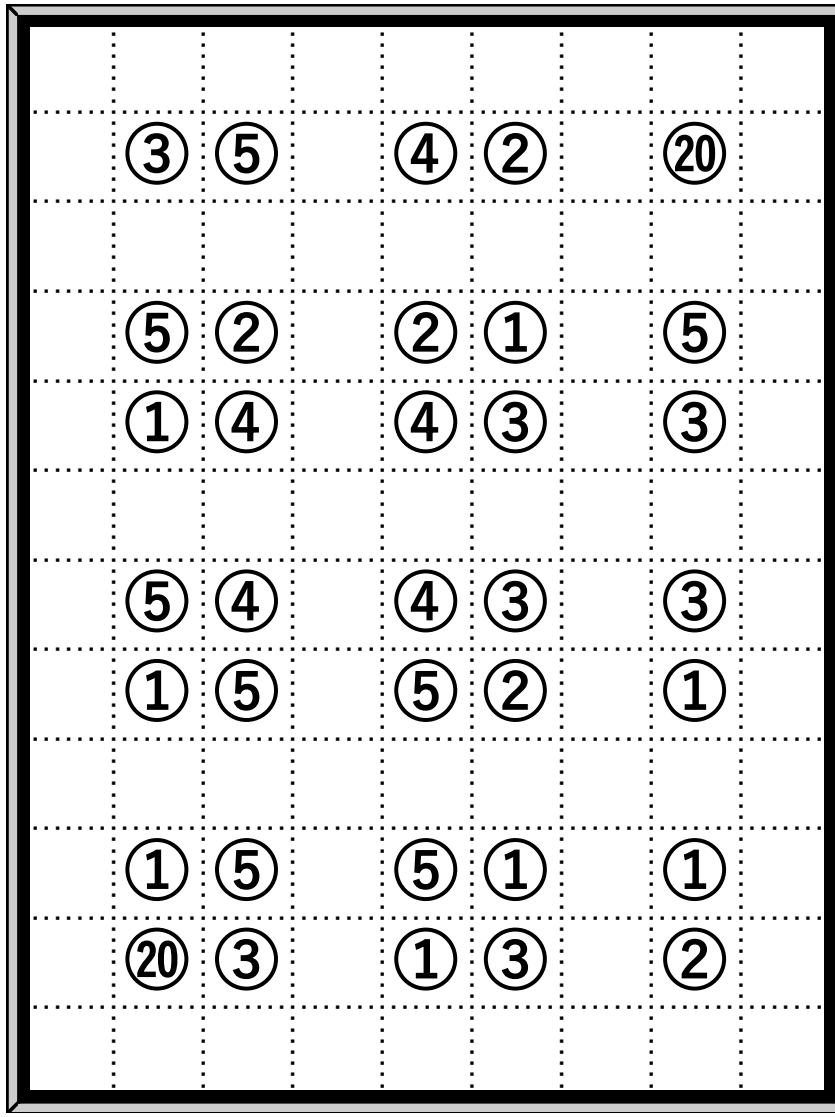
PUZZLE NO. 1



PUZZLE NO. 2



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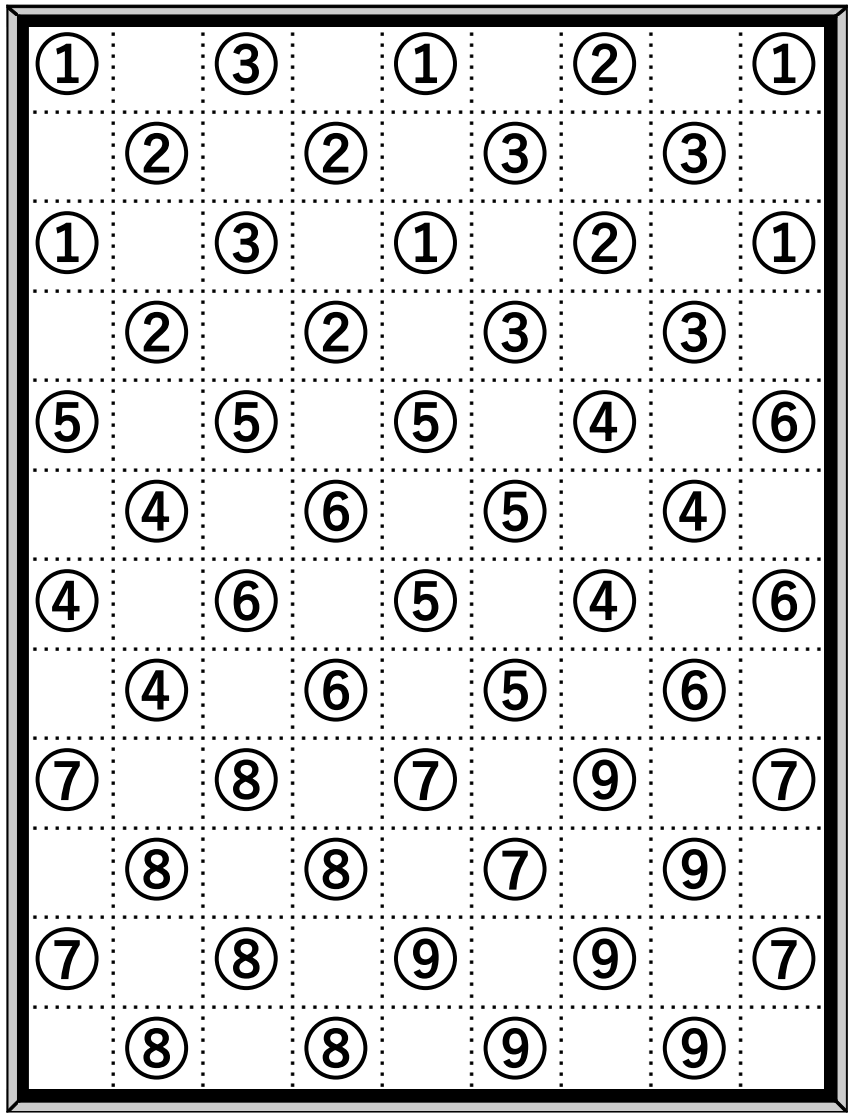
① ③ ① ② ①
② ② ③ ③
① ③ ① ② ①
② ② ③ ③
⑤ ⑤ ⑤ ④ ⑥
④ ⑥ ⑤ ④
④ ⑥ ⑤ ④ ⑥
④ ⑥ ⑤ ⑥
⑦ ⑧ ⑦ ⑨ ⑦
⑧ ⑧ ⑦ ⑨
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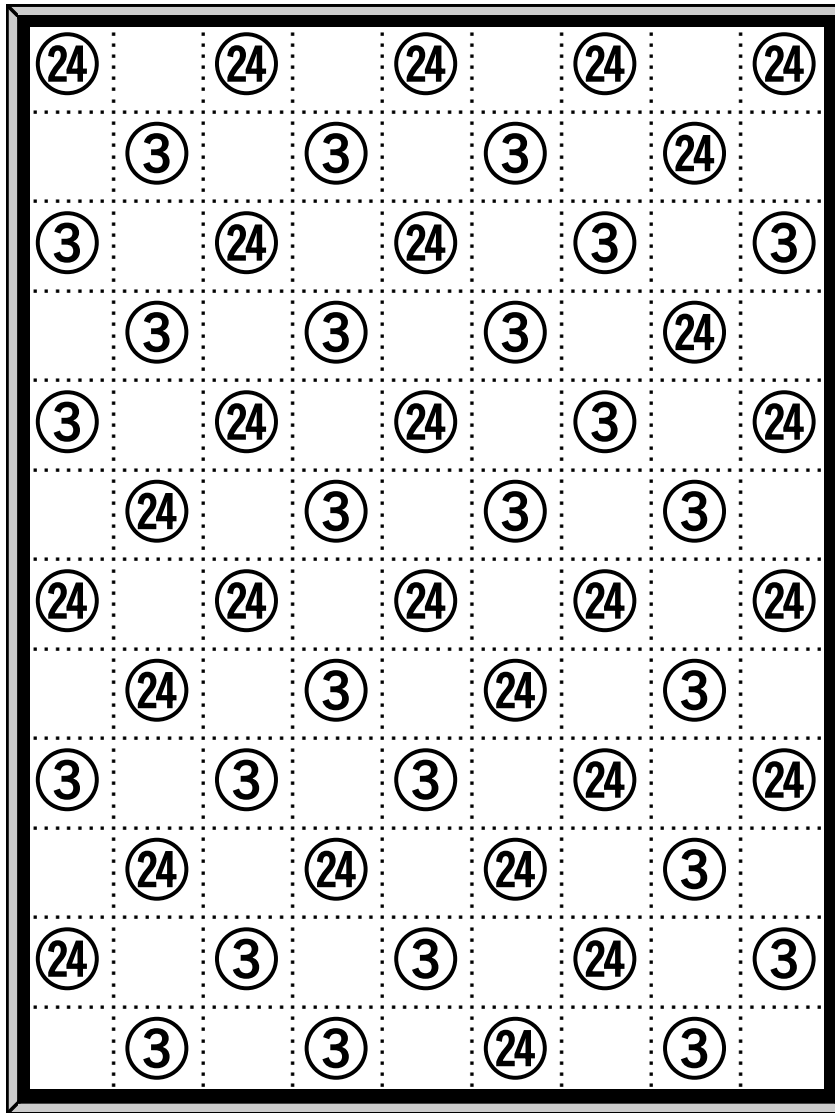
⑧ ⑧ ⑨ ⑨

PUZZLE NO. 4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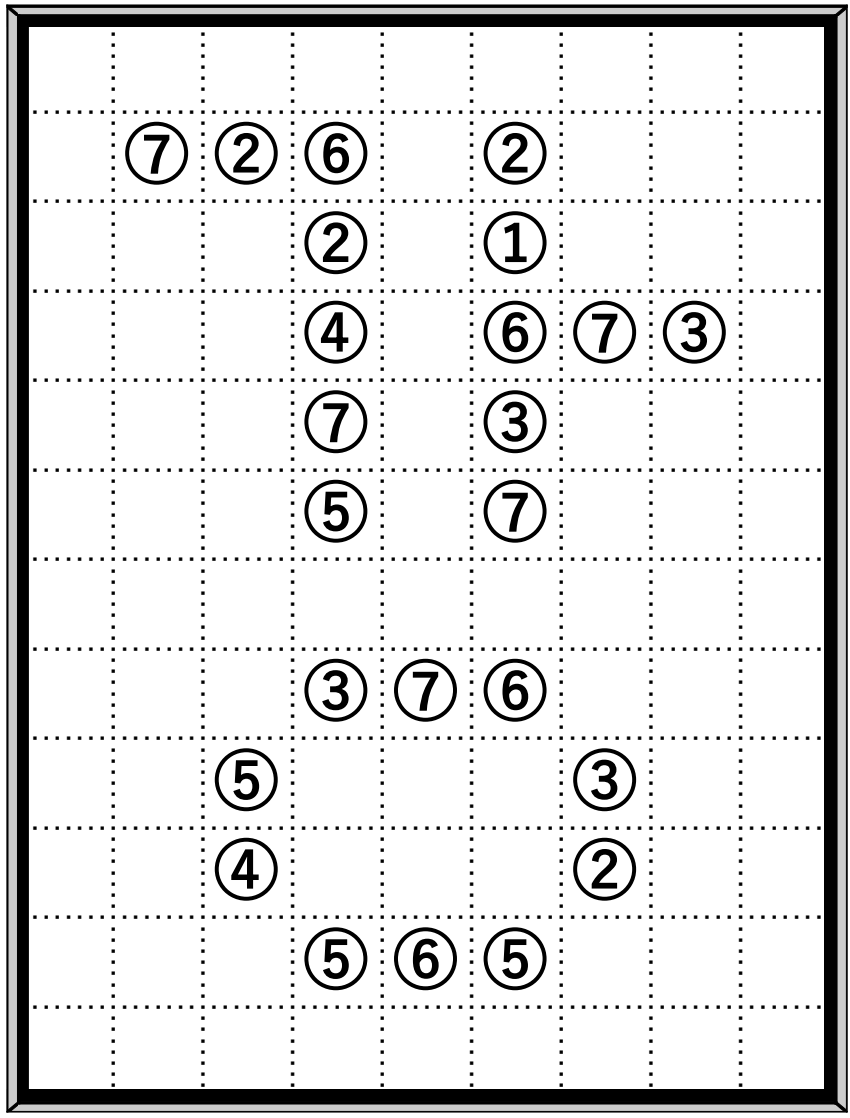
PUZZLE NO. 5



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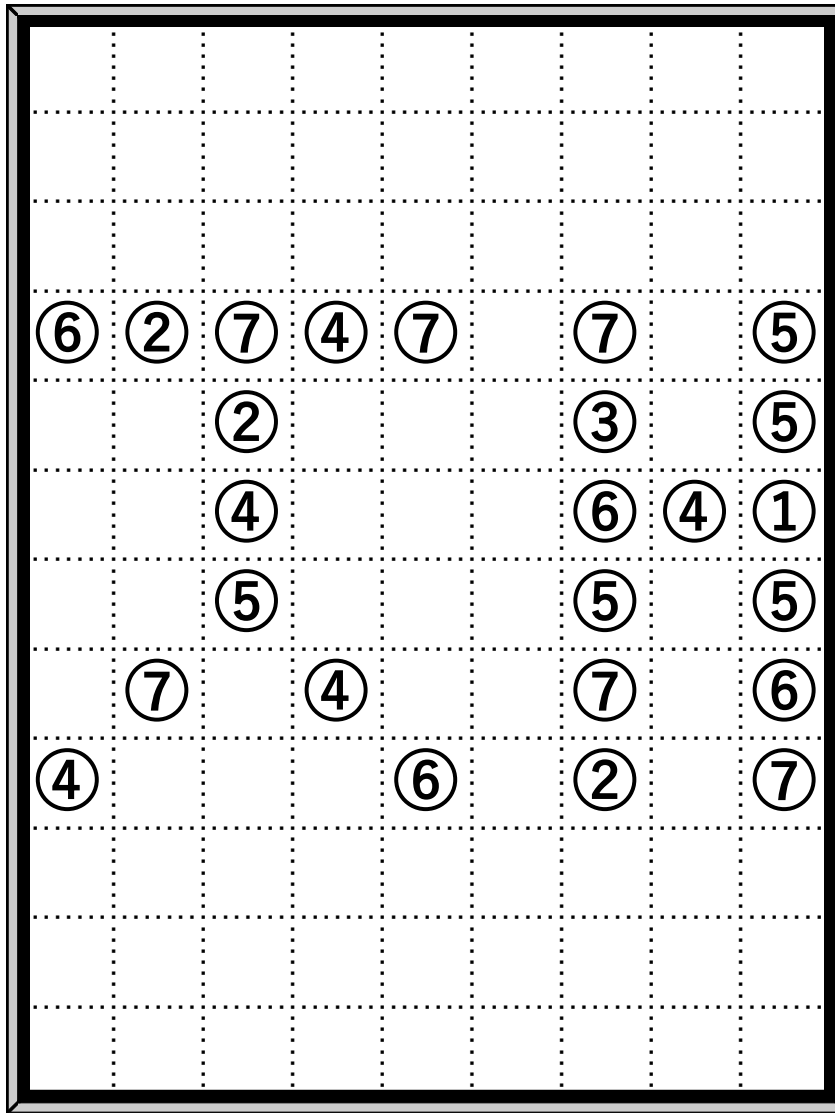

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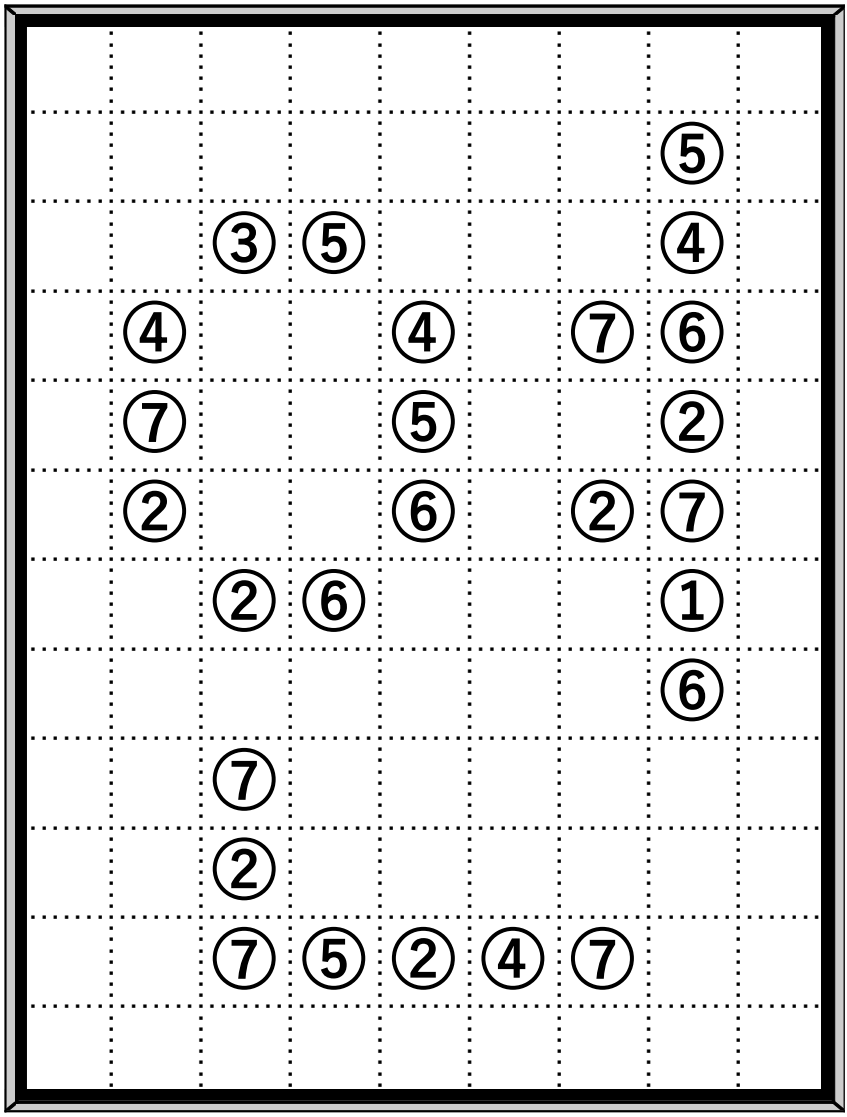
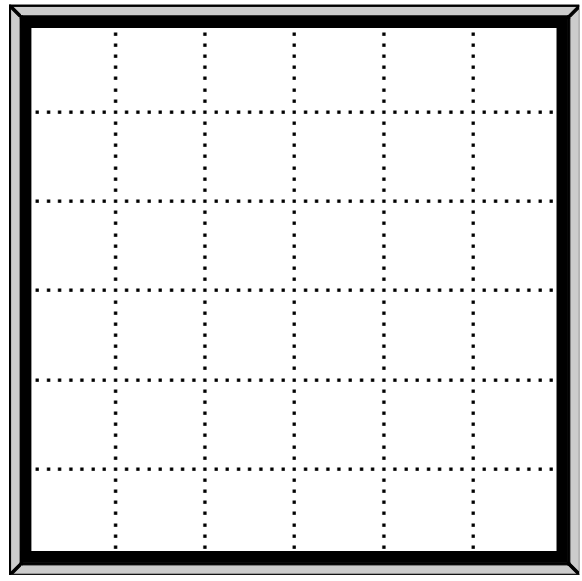


MONTEVERDI'S CHALLENGE

Dear puzzle solvers, we appreciate your time and effort in solving the **FILLOMINO PUZZLES** in our book. We hope you had fun in solving the puzzles.

As we mentioned in the **INTRODUCTION** section, part of our goal in making this book is that we also hope to inspire fellow puzzle enthusiasts to try to create their own puzzles too. Up to this point, you have been playing the part as a puzzle solver. And now that you have finished solving the puzzles in this book, we believe that you have obtained a certain sense and idea of how to create **FILLOMINO PUZZLES**.

And this is what this section is all about – for you to try to create your own **FILLOMINO PUZZLE** under a certain constraint. In this challenge, you are given a 6 x 6 puzzle grid. Your puzzle clues set is given by **C: {①, ②, ③, ④, ⑤, ⑥, ⑦}**. You should place these seven clues on the grid so that there is exactly one solution to the puzzle. Give yourself an additional bonus point if your puzzle's unique solution will only contain polyominoes of size 7 or less.

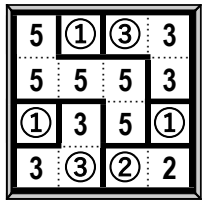


C: {①, ②, ③, ④, ⑤, ⑥, ⑦}

ANSWERS

4 x 4 PUZZLES

NO. 1



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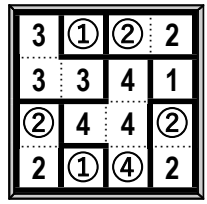

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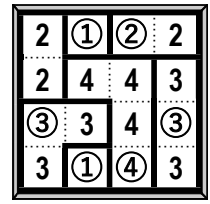

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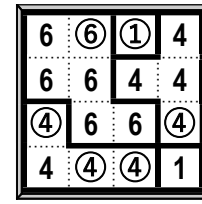

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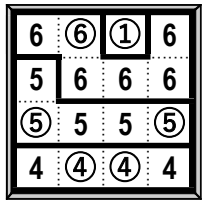

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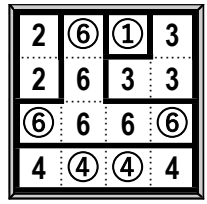

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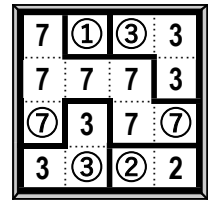

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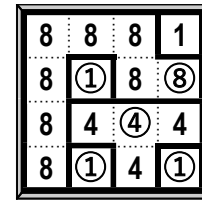

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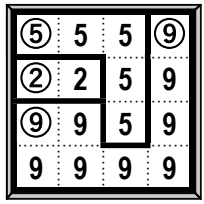

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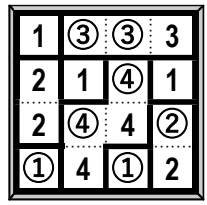

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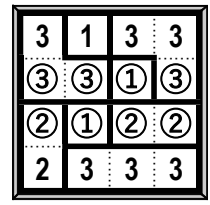

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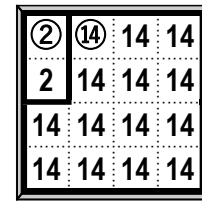

5 x 5 PUZZLES

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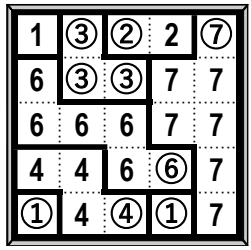

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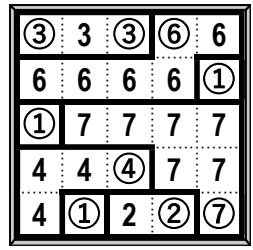

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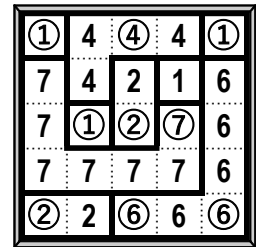

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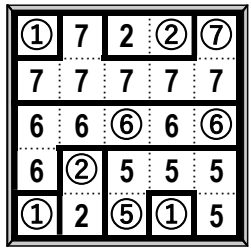

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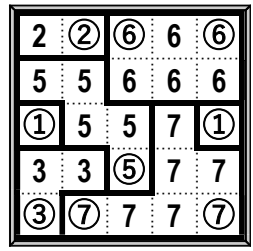

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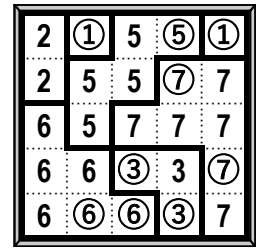

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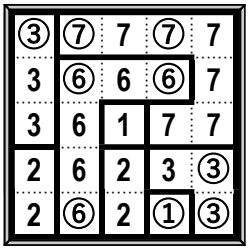

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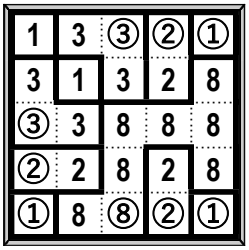

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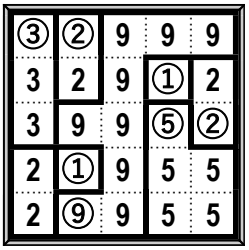

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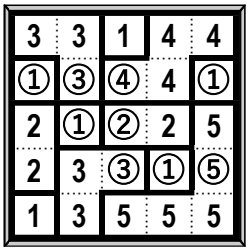

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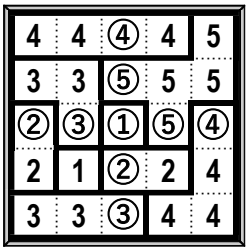

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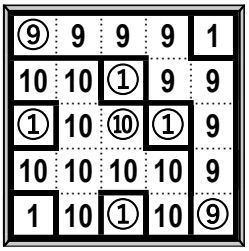

6 x 6 PUZZLES

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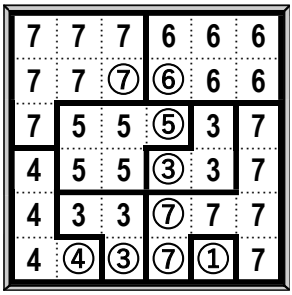

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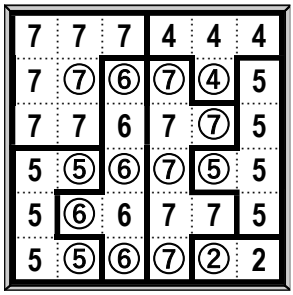

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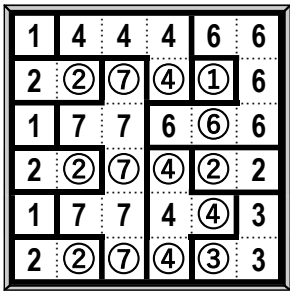

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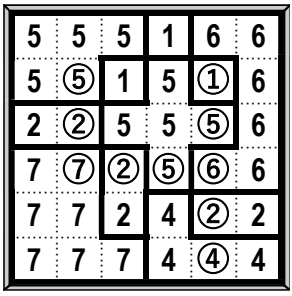

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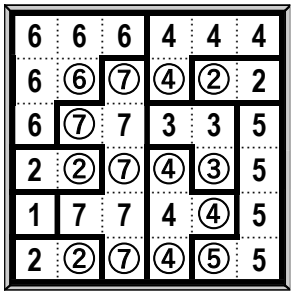

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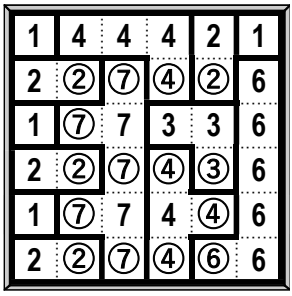

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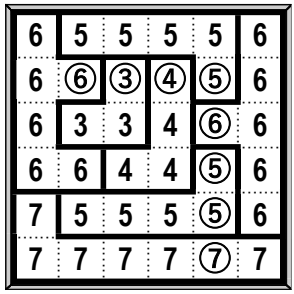

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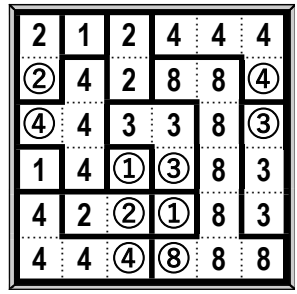

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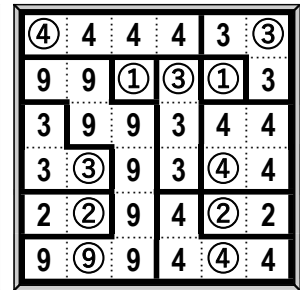

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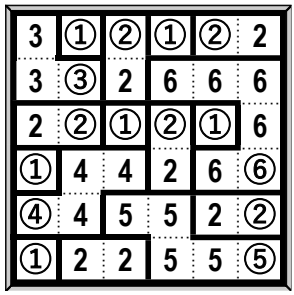

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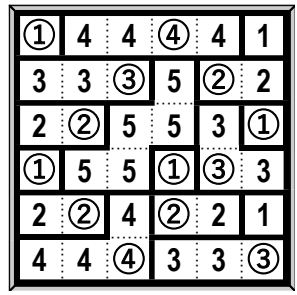

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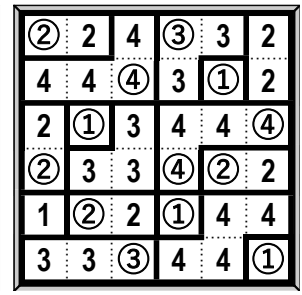

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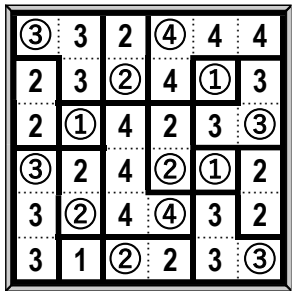

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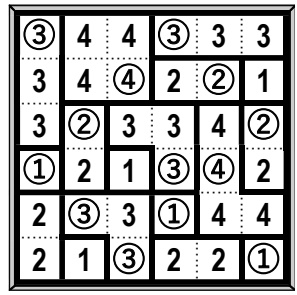

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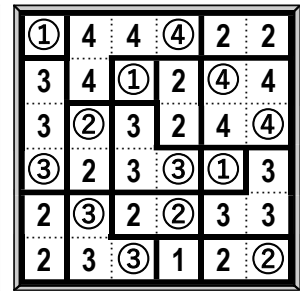

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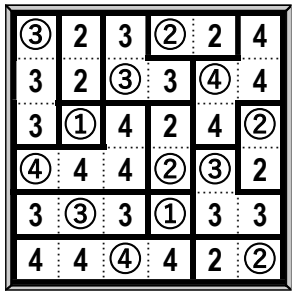

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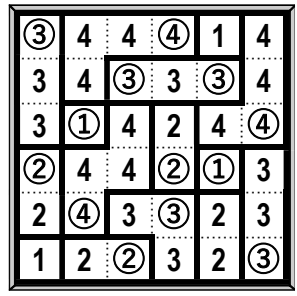

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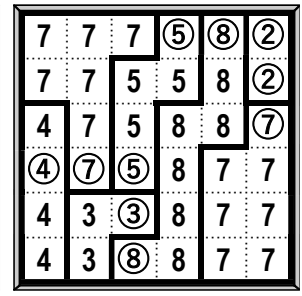
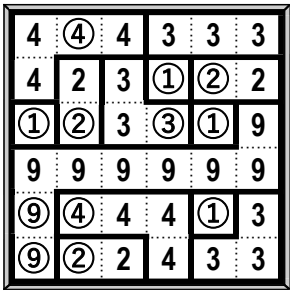
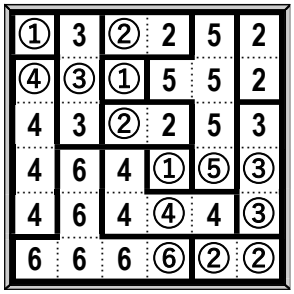


NO. 19



NO. 20



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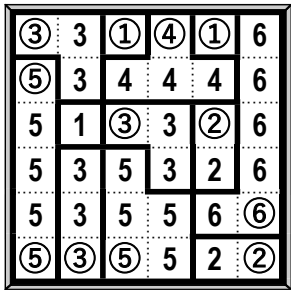

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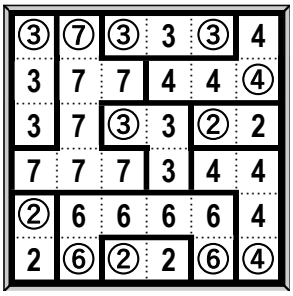
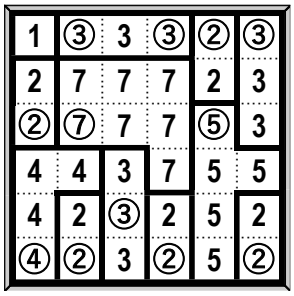


NO. 23



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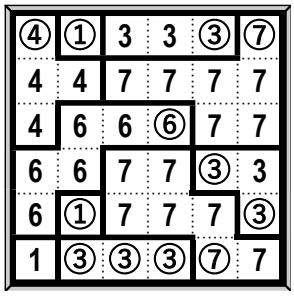

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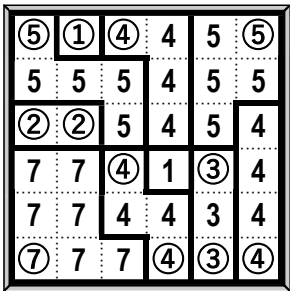

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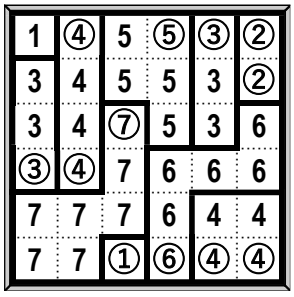

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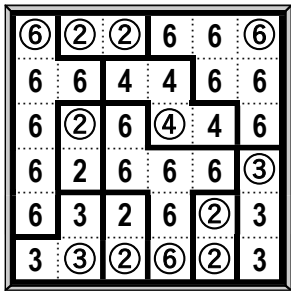
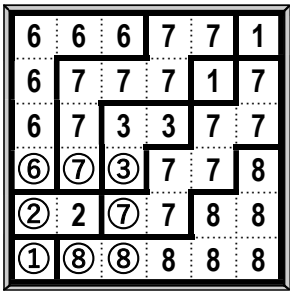


NO. 28



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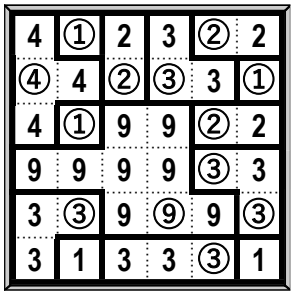

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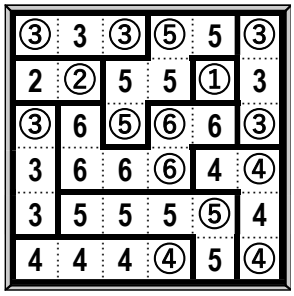

NO. 31

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3	1	③	③	4	4
1	③	4	4	3	3
3	3	4	4	③	①
①	4	③	③	4	4
4	4	4	3	4	4

NO. 32

③	3	1	3	1	③
3	1	③	3	②	3
1	3	2	1	2	3
3	③	②	3	3	1
2	2	1	③	1	3
③	3	3	1	3	③

NO. 33

③	3	1	3	4	4
3	1	③	③	4	4
1	③	4	4	3	3
③	3	4	4	③	1
4	4	③	③	1	3
4	4	3	1	3	③

NO. 34

③	3	1	3	4	4
3	1	③	3	4	4
1	③	④	4	③	3
③	3	1	4	4	③
4	4	4	5	5	5
④	③	3	3	5	5

NO. 35

③	3	1	③	4	4
3	1	③	3	4	4
1	③	4	4	3	3
③	3	4	4	③	5
⑤	5	③	3	⑤	5
5	5	5	3	5	5

NO. 36

③	⑥	3	③	2	2
3	6	3	6	3	3
3	6	6	6	③	1
2	3	③	③	1	3
2	6	6	6	3	③
3	3	③	6	6	⑥

NO. 37

③	⑦	7	3	3	③
3	3	7	7	7	7
7	7	1	③	3	7
3	7	3	1	③	1
3	7	3	③	1	3
③	7	7	⑦	3	③

NO. 38

2	4	4	④	5	5
2	4	3	⑤	⑤	5
4	2	3	①	③	②
④	②	③	5	3	2
4	⑤	⑤	5	3	1
4	2	②	5	2	2

NO. 39

2	②	5	5	⑤	⑤
③	3	③	5	2	②
4	④	4	3	3	5
4	5	5	5	③	5
⑤	5	4	③	5	⑤
④	④	4	3	③	5

NO. 40

①	6	⑥	6	5	6
4	④	6	6	5	6
⑤	4	②	6	5	6
5	4	2	③	5	⑥
5	5	3	3	⑤	6
5	4	4	④	4	⑥

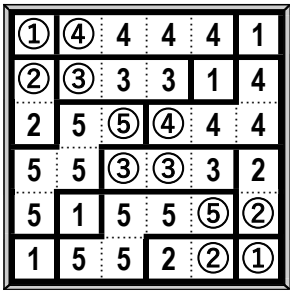
NO. 41

2	3	3	2	2	3
2	①	③	①	③	3
①	2	①	④	4	④
③	2	3	4	3	③
3	①	③	③	④	3
3	2	2	4	4	4

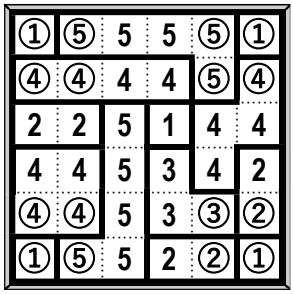
NO. 42

6	6	6	6	6	1
①	②	③	⑥	⑤	④
6	2	3	3	5	4
6	6	6	6	5	4
②	①	③	⑥	⑤	④
2	3	3	1	5	1

NO. 43



NO. 44



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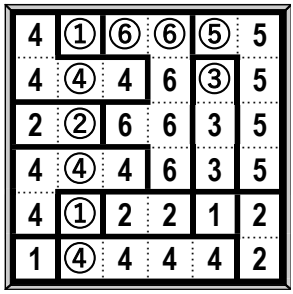

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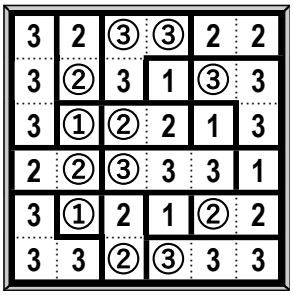
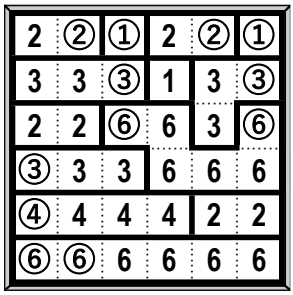
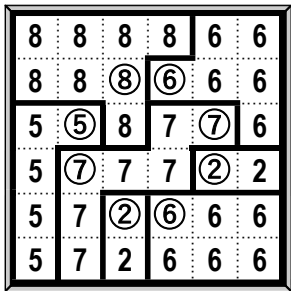


NO. 47



NO. 48



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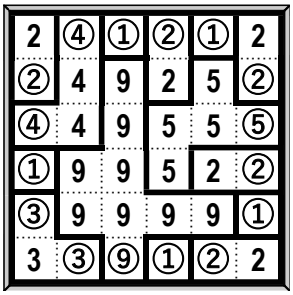

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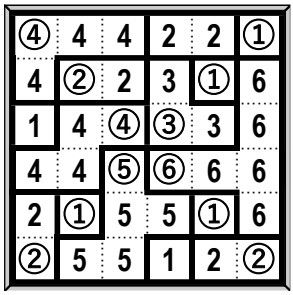

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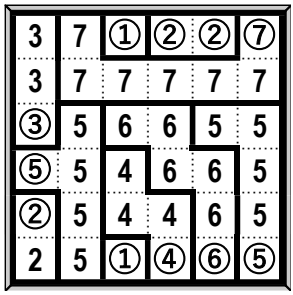
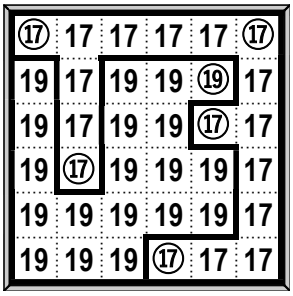
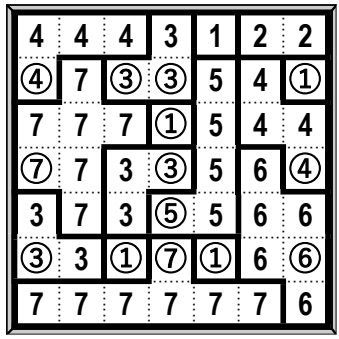


NO. 52

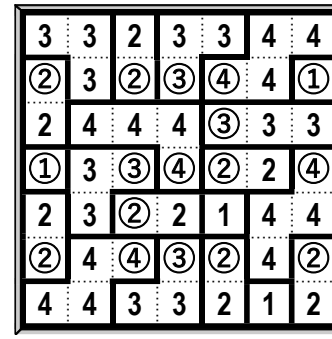


7 x 7 PUZZLES

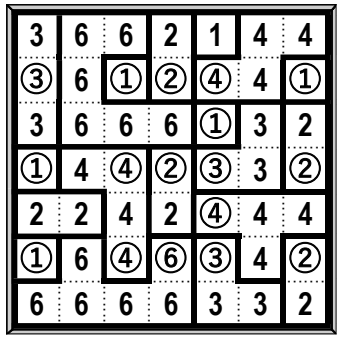
NO. 1



NO. 2



NO. 3



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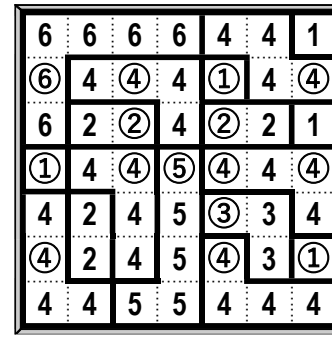

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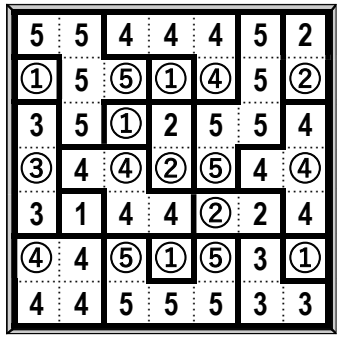
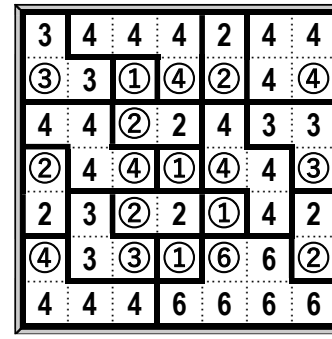
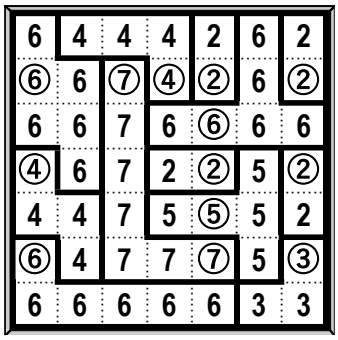


NO. 6



NO. 7



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6	6	7	6	⑥	6	6
④	6	7	2	②	5	②
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⑥	4	7	7	⑦	5	③
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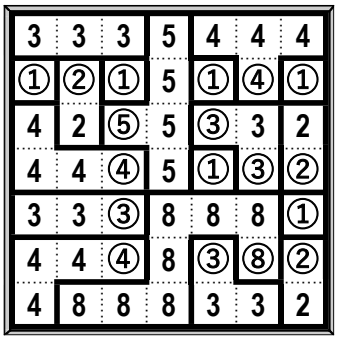
NO. 8



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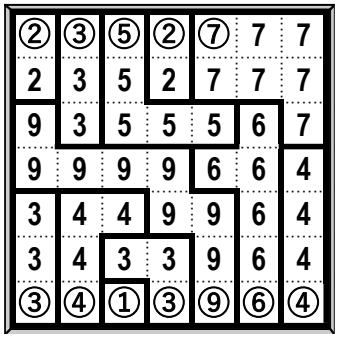
4	2	⑤	5	③	3	2
4	4	④	5	①	③	②
3	3	③	8	8	8	①
4	4	④	8	③	⑧	②
4	8	8	8	3	3	2

NO. 9



②	③	⑤	②	⑦	7	7
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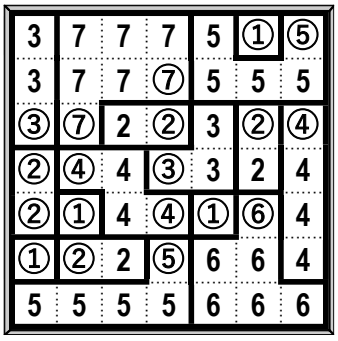
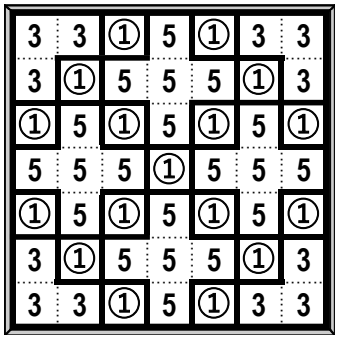
9	3	5	5	5	6	7
9	9	9	9	6	6	4
3	4	4	9	9	6	4
3	4	3	3	9	6	4
③	④	①	③	⑨	⑥	④

NO. 10



3	7	7	7	5	①	⑤
3	7	7	⑦	5	5	5
③	⑦	2	②	3	②	④
②	④	4	③	3	2	4
②	①	4	④	①	⑥	4
①	②	2	⑤	6	6	4
5	5	5	5	6	6	6

NO. 11



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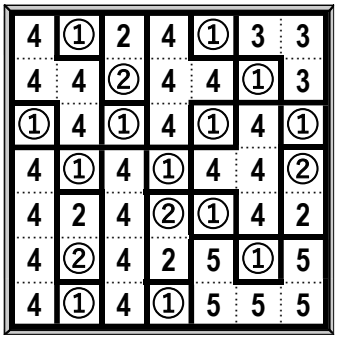
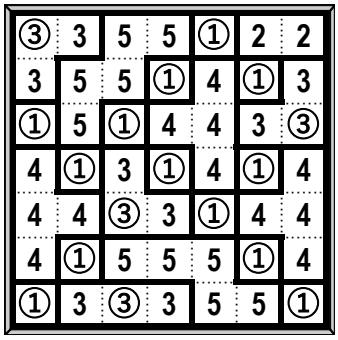
①	5	①	5	①	5	①
5	5	5	①	5	5	5
①	5	①	5	①	5	①
3	①	5	5	5	①	3
3	3	①	5	①	3	3

NO. 12



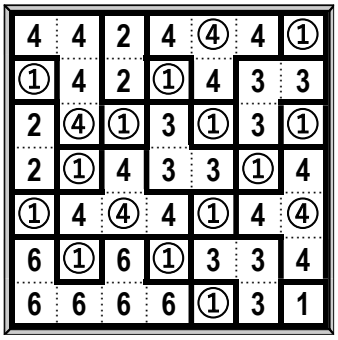
4	①	2	4	①	3	3
4	4	②	4	4	①	3
①	4	①	4	①	4	①
4	①	4	①	4	4	②
4	2	4	②	①	4	2
4	②	4	2	5	①	5
4	①	4	①	5	5	5

NO. 13



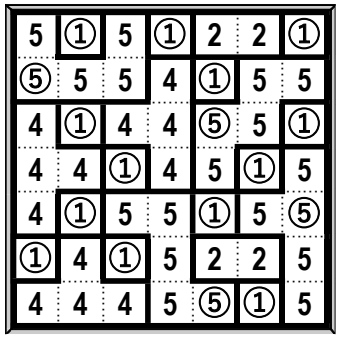
③	3	5	5	①	2	2
3	5	5	①	4	①	3
①	5	①	4	4	3	③
4	①	3	①	4	①	4
4	4	③	3	①	4	4
4	①	5	5	5	①	4
①	3	③	3	5	5	①

NO. 14

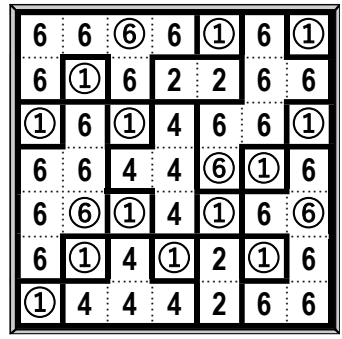


4	4	2	4	④	4	①
①	4	2	①	4	3	3
2	④	①	3	①	3	①
2	①	4	3	3	①	4
①	4	④	4	①	4	④
6	①	6	①	3	3	4
6	6	6	6	①	3	1

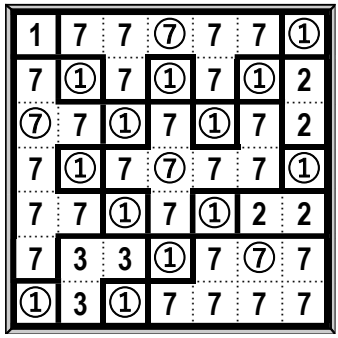
NO. 15



NO. 16



NO. 17



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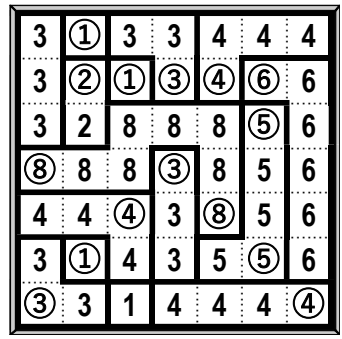

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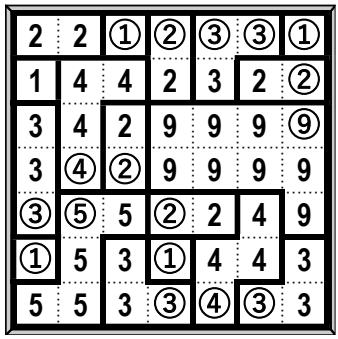

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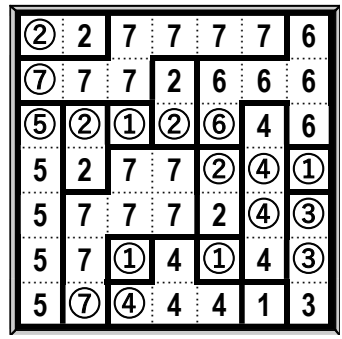

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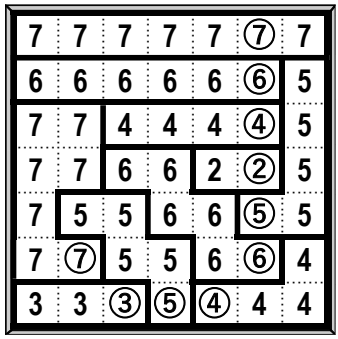

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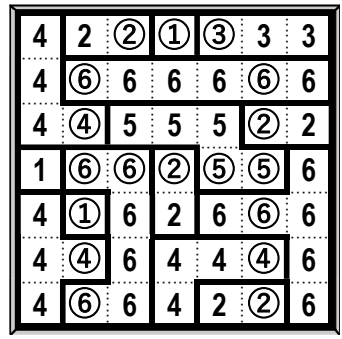

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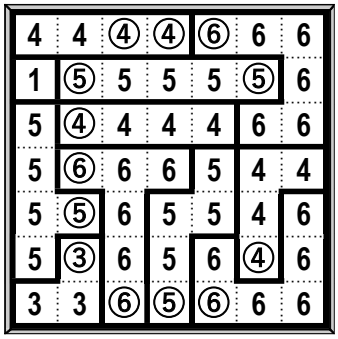

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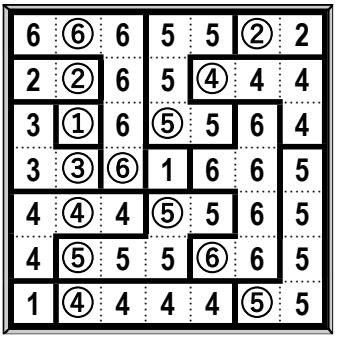

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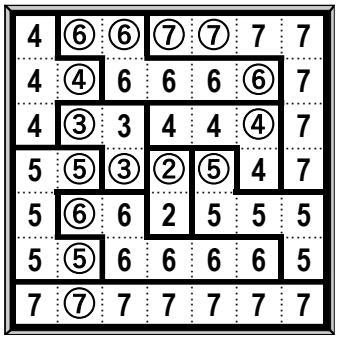

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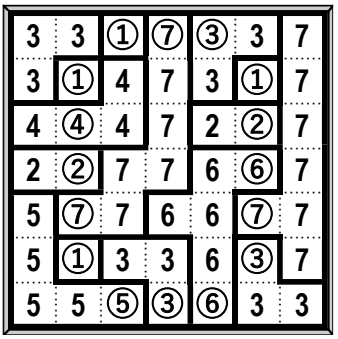

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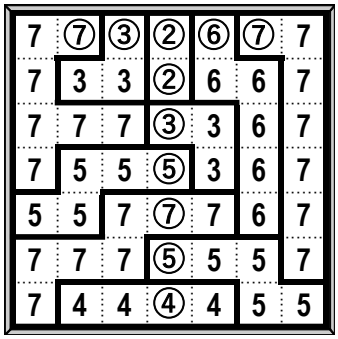

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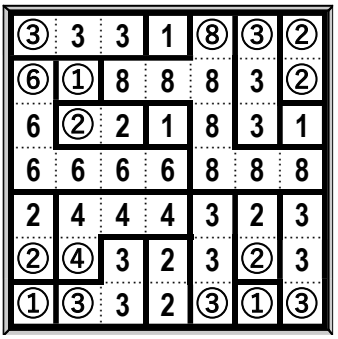

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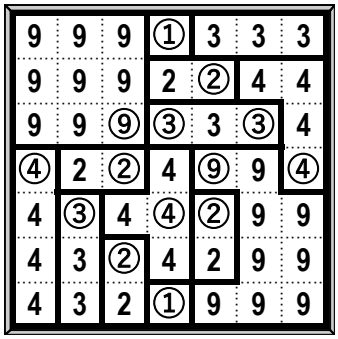

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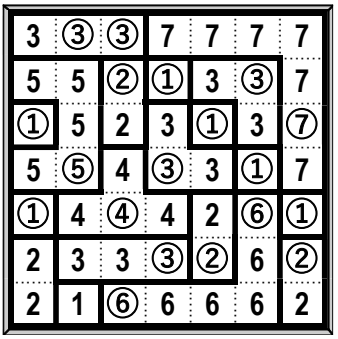

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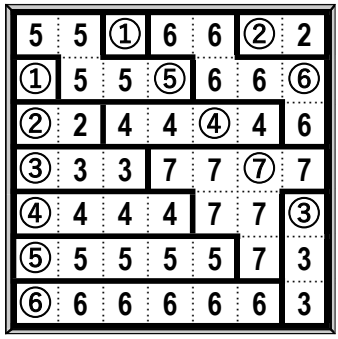

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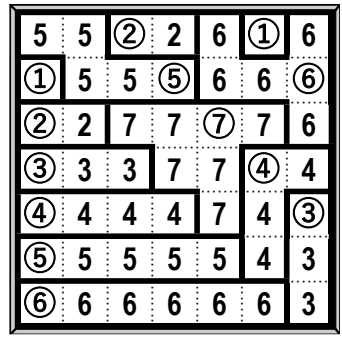

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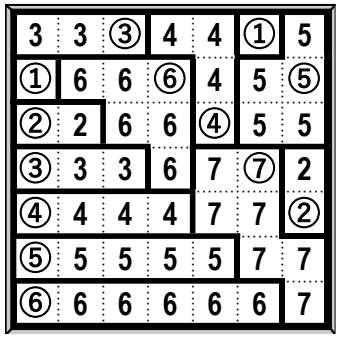

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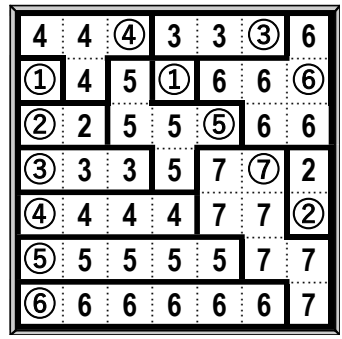

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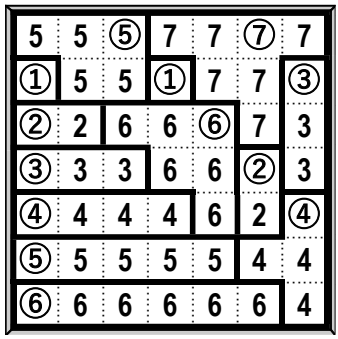

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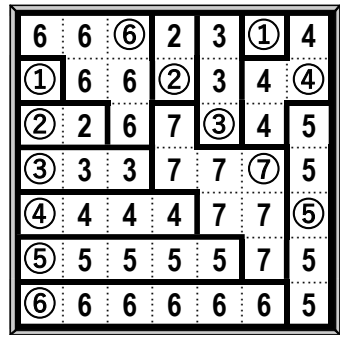

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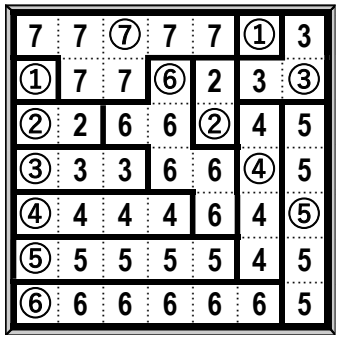

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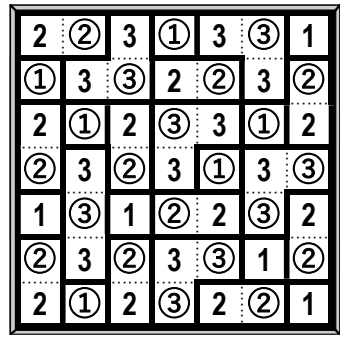

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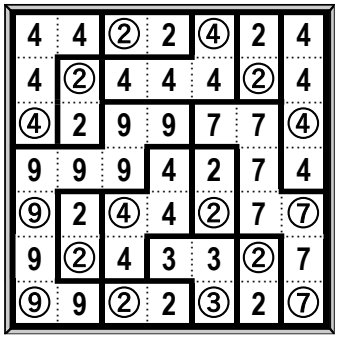

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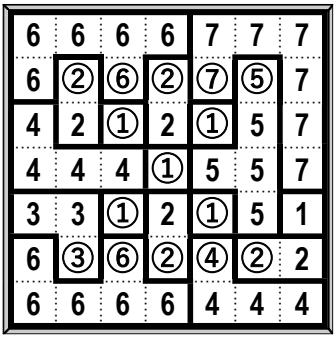

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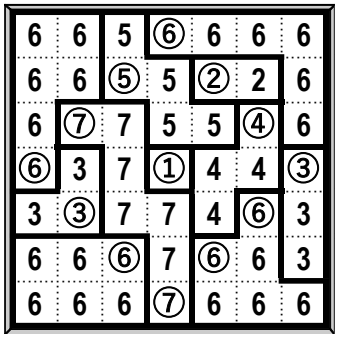

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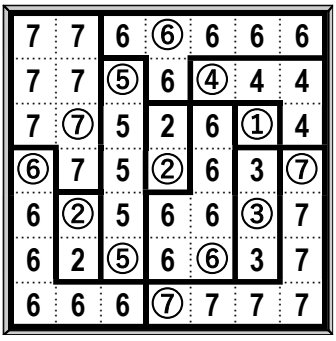

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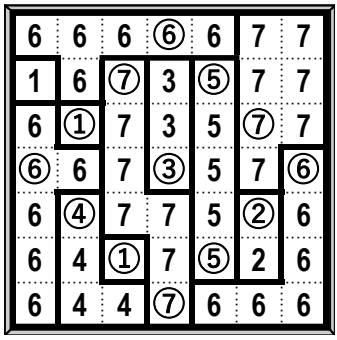

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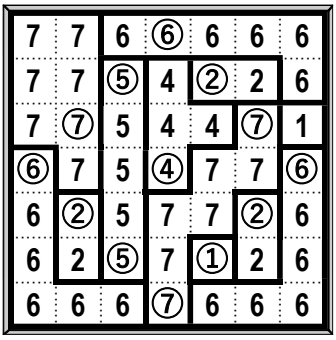

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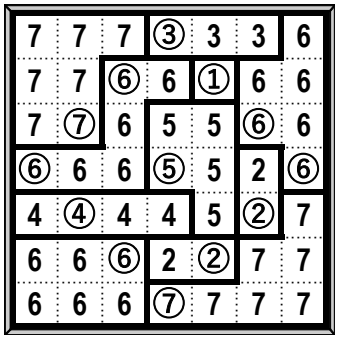

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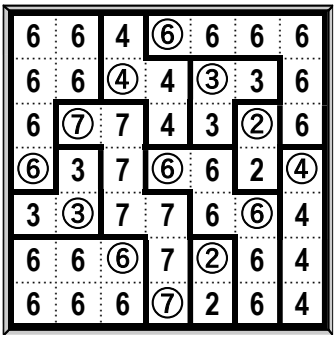

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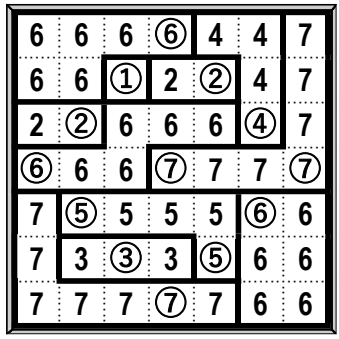

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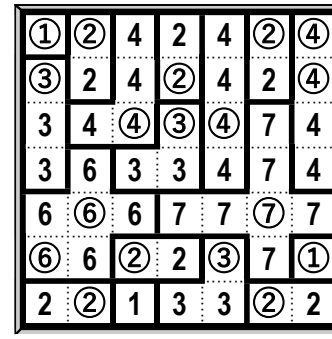

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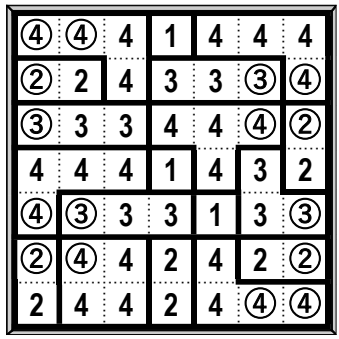

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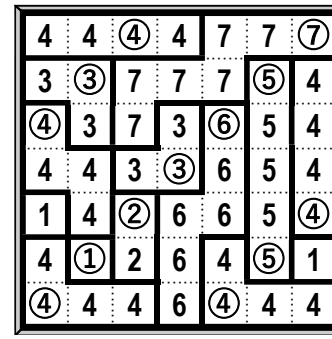

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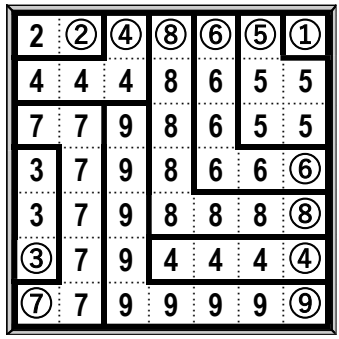

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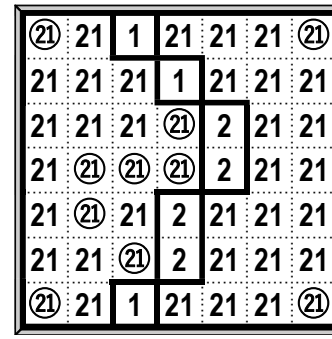
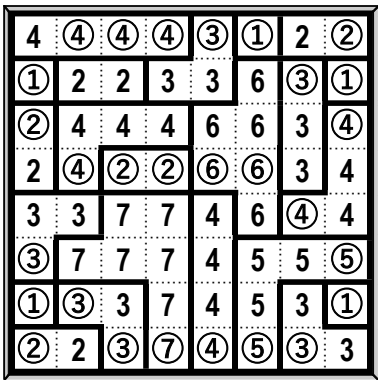


8 x 8 PUZZLES

NO. 1



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②	4	4	4	6	6	3	④
2	④	②	②	⑥	⑥	3	4
3	3	7	7	4	6	④	4
③	7	7	7	4	5	5	⑤
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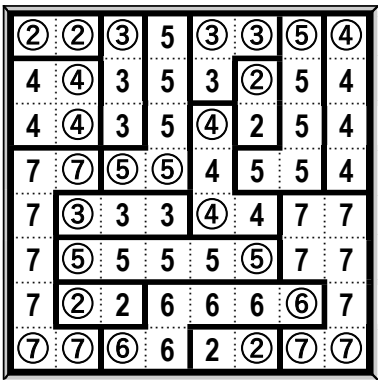
②	2	③	⑦	④	⑤	③	3

NO. 2



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4	④	3	5	④	2	5	4
7	⑦	⑤	⑤	4	5	5	4
7	③	3	3	④	4	7	7
7	⑤	5	5	5	⑤	7	7
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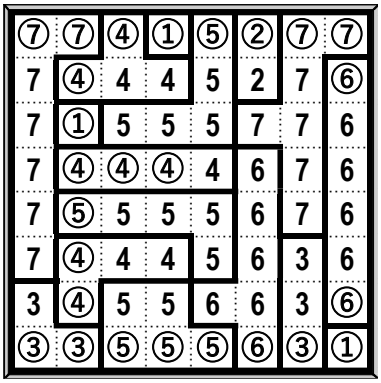
NO. 3



⑦	⑦	④	①	⑤	②	⑦	⑦
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7	①	5	5	5	7	7	6
7	④	④	④	4	6	7	6
7	⑤	5	5	5	6	7	6
7	④	4	4	5	6	3	6
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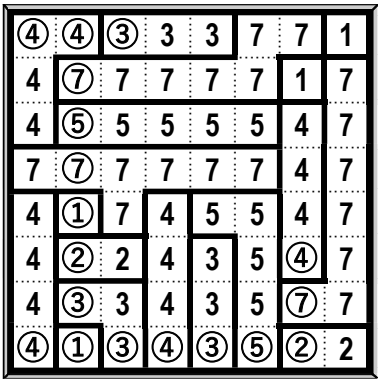
NO. 4



④	④	③	3	3	7	7	1
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7	⑦	7	7	7	7	4	7
4	①	7	4	5	5	4	7
4	②	2	4	3	5	④	7
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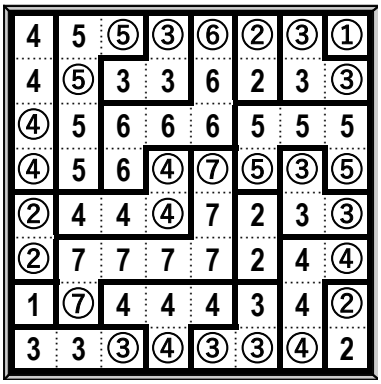
NO. 5



4	5	⑤	③	⑥	②	③	①
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④	5	6	6	6	5	5	5
④	5	6	④	⑦	⑤	③	⑤
②	4	4	④	7	2	3	③
②	7	7	7	7	2	4	④
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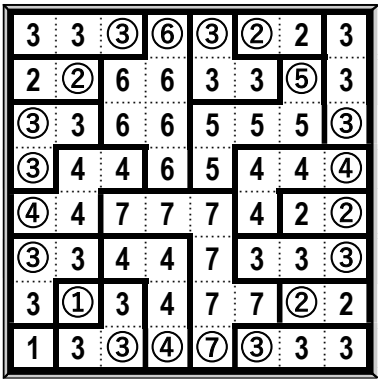
NO. 6



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③	3	6	6	5	5	5	③
③	4	4	6	5	4	4	④
④	4	7	7	7	4	2	②
③	3	4	4	7	3	3	③
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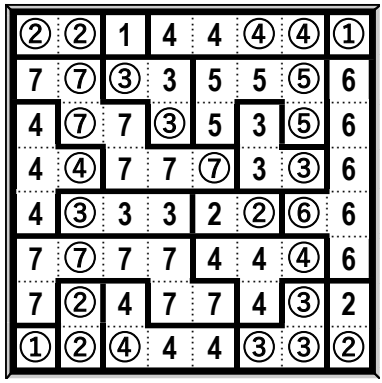
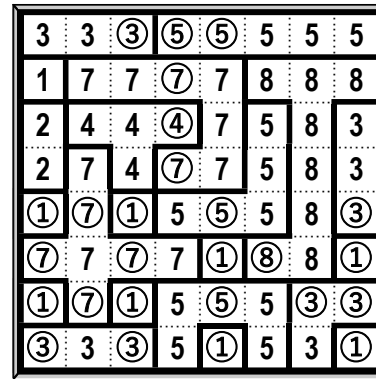
NO. 7



NO. 8



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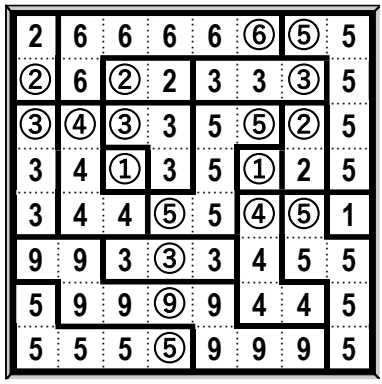

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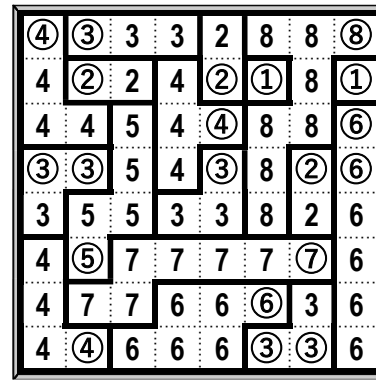

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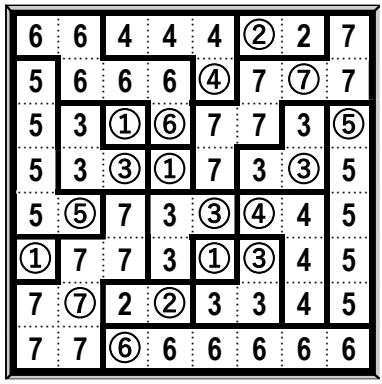

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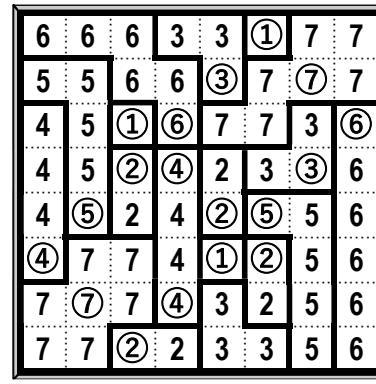

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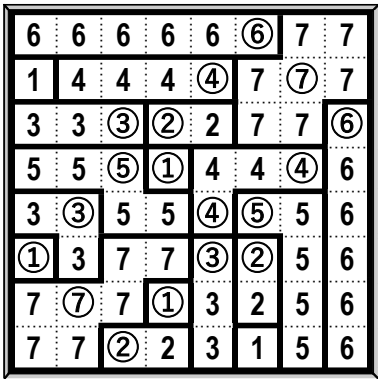

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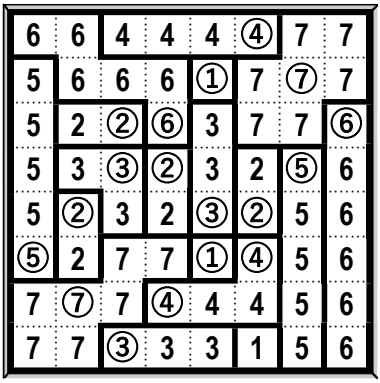

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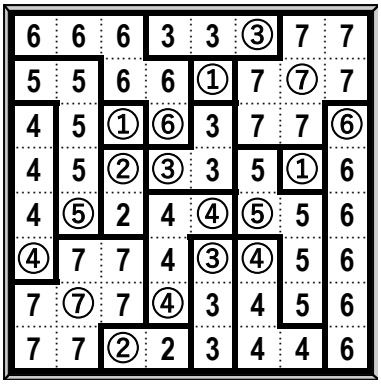

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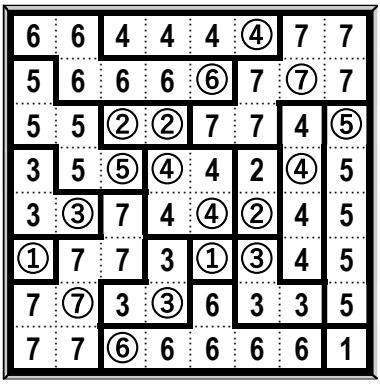

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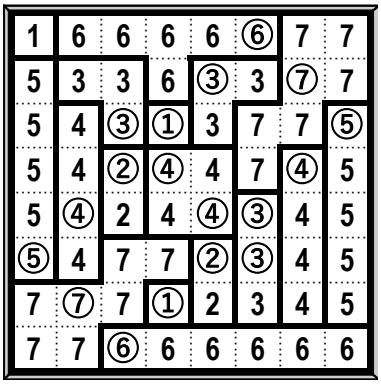

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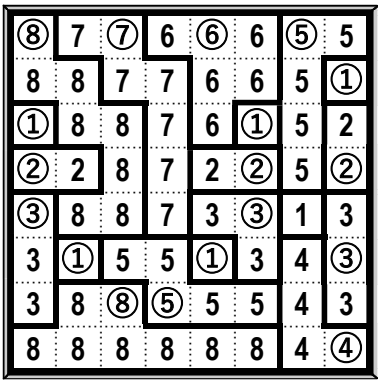

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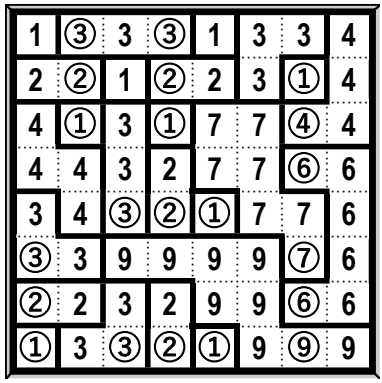

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4	4	3	2	7	7	⑥	6
3	4	③	②	①	7	7	6
③	3	9	9	9	9	⑦	6
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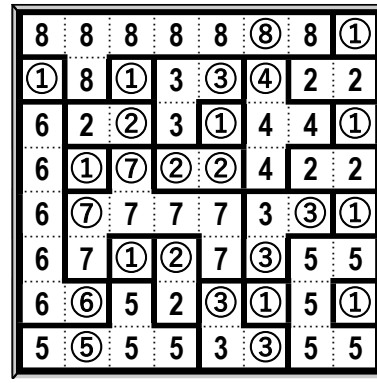

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6	⑦	7	7	7	3	③	①
6	7	①	②	7	③	5	5
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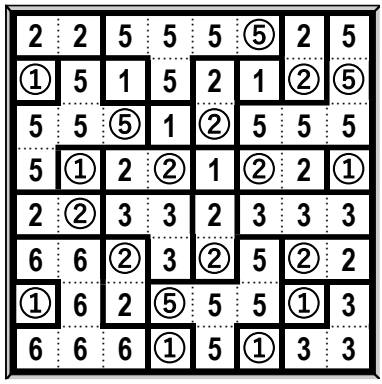

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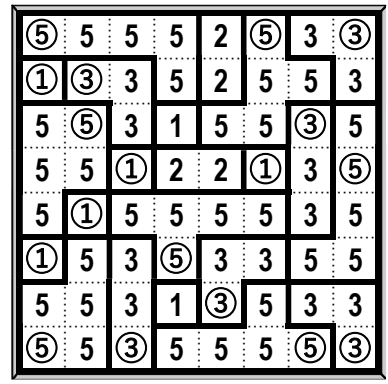

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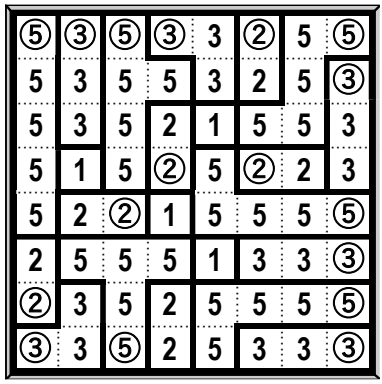

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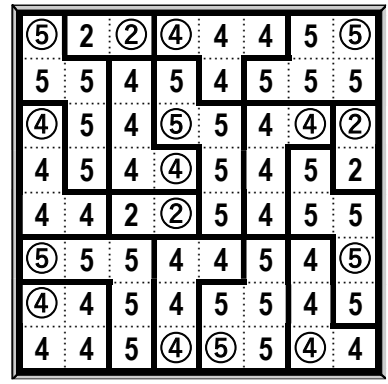

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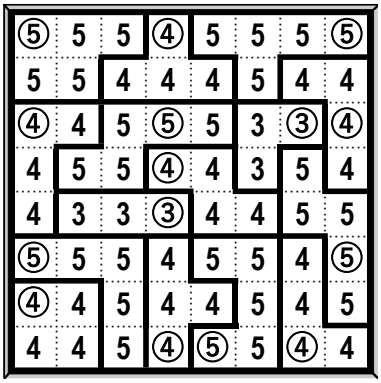

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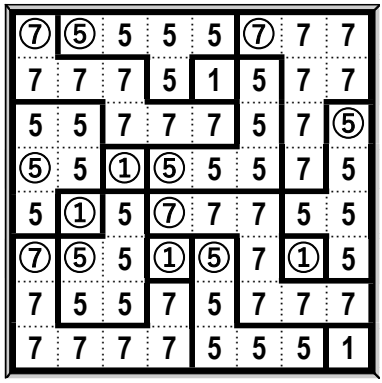

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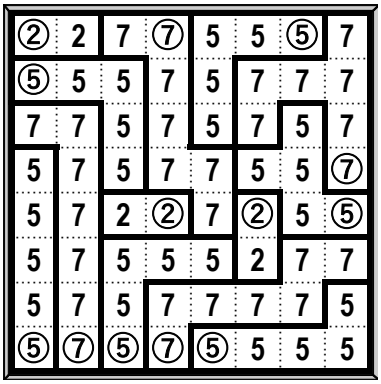

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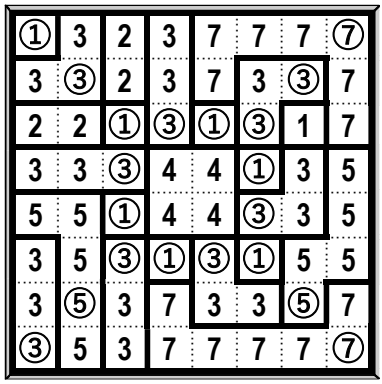

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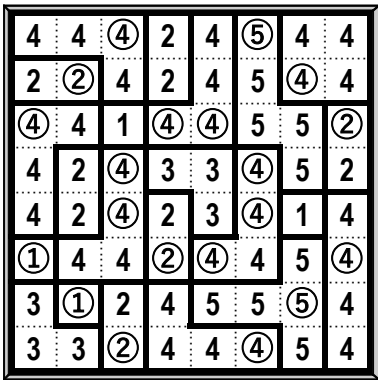

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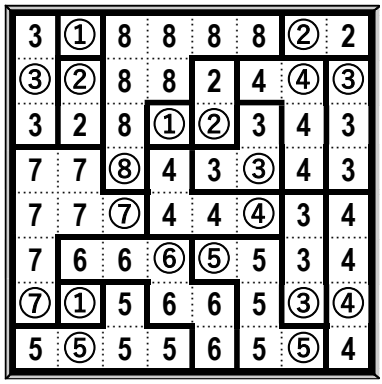

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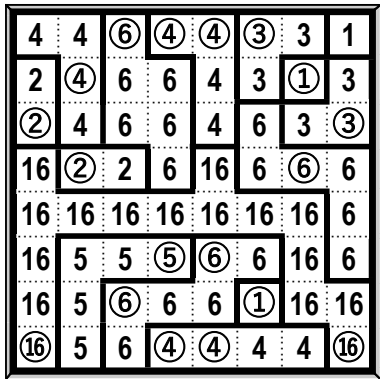

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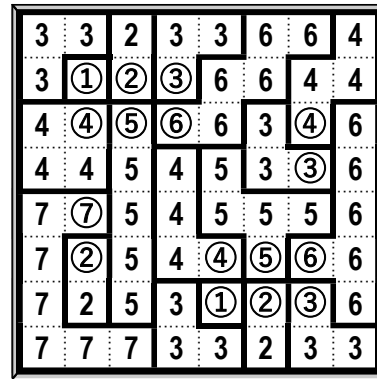

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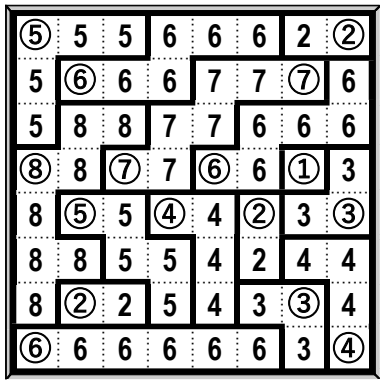

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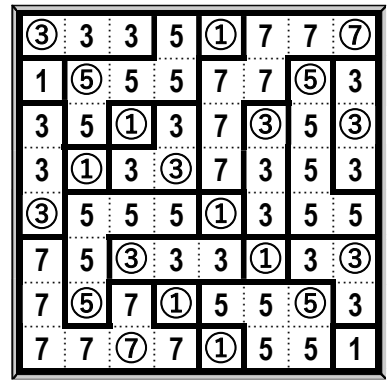

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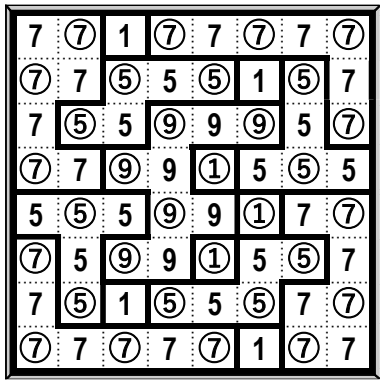

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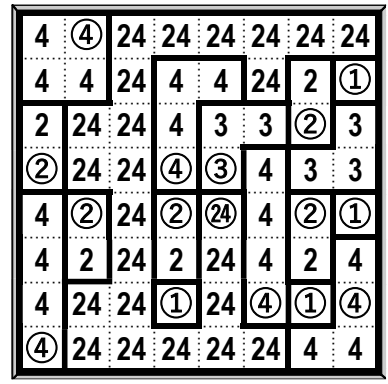

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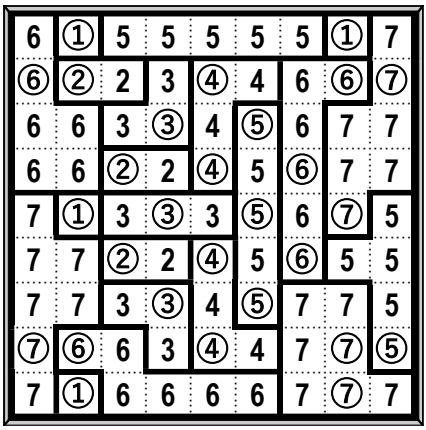

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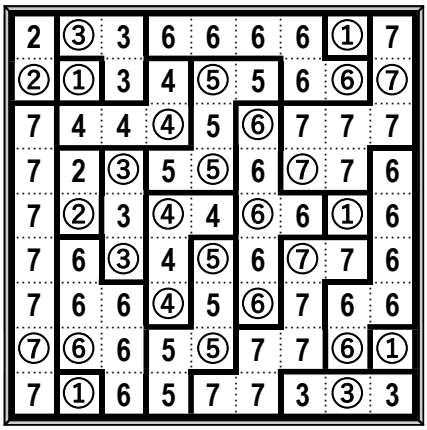

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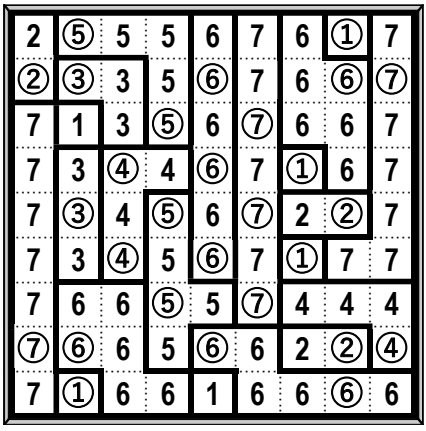

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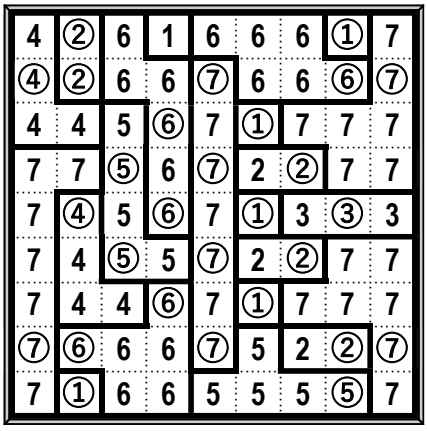

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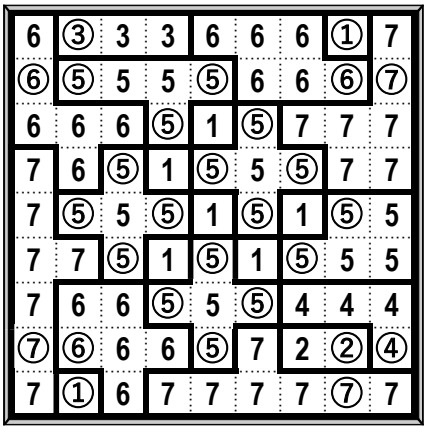

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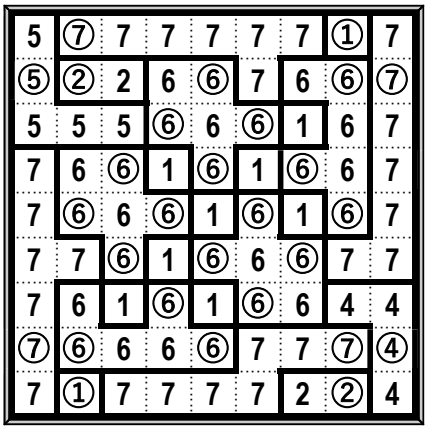

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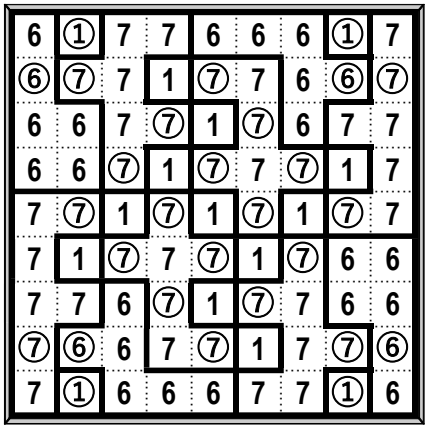

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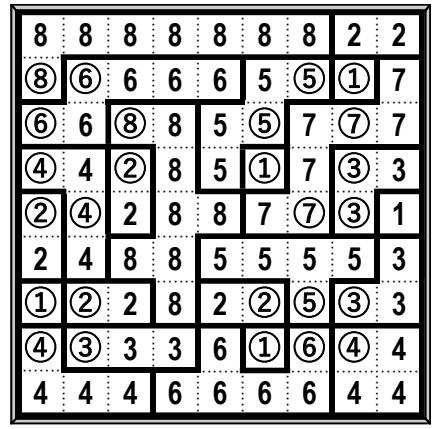

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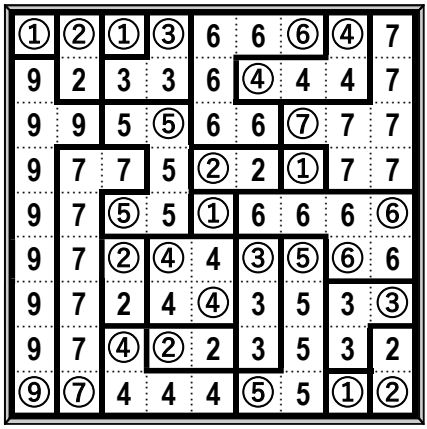

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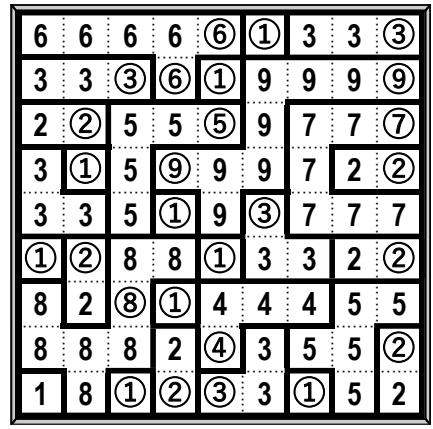

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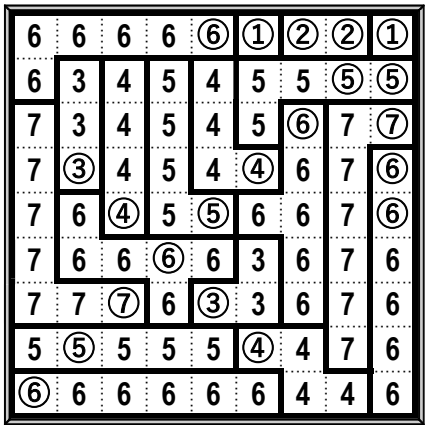

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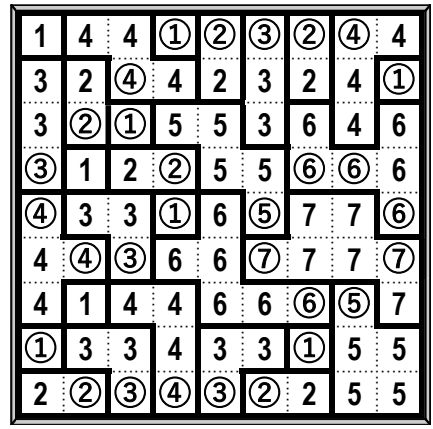

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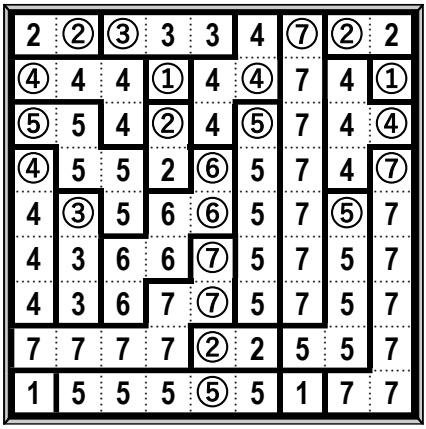

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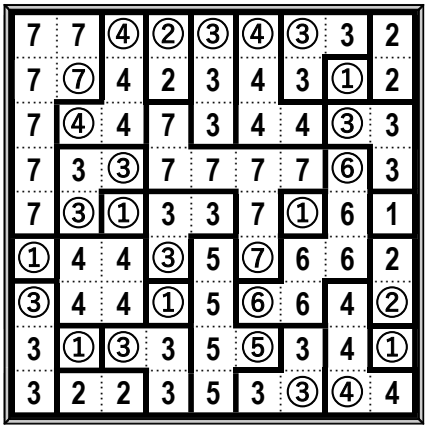

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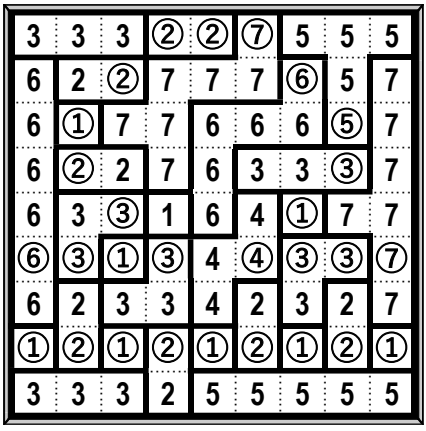

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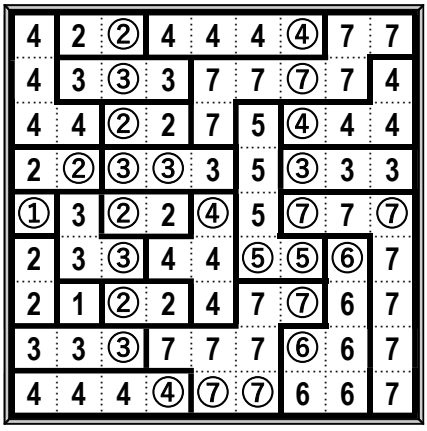

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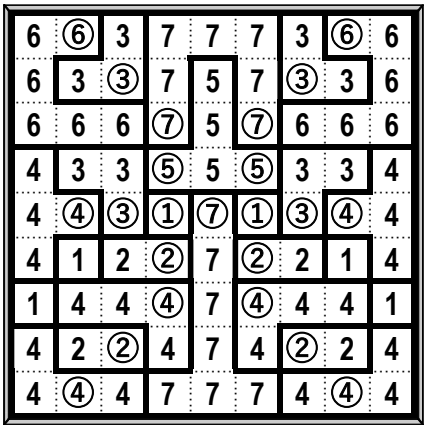

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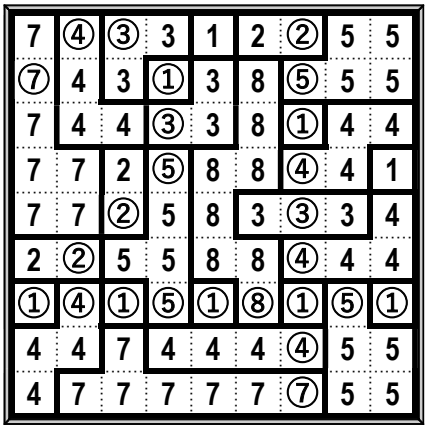

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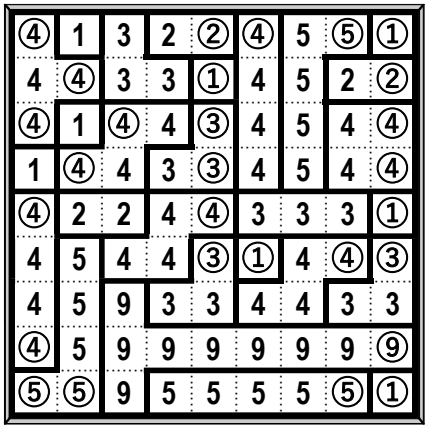

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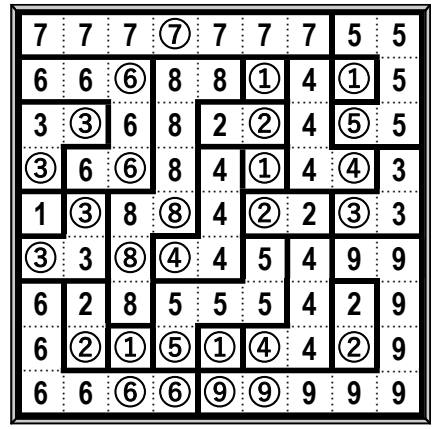

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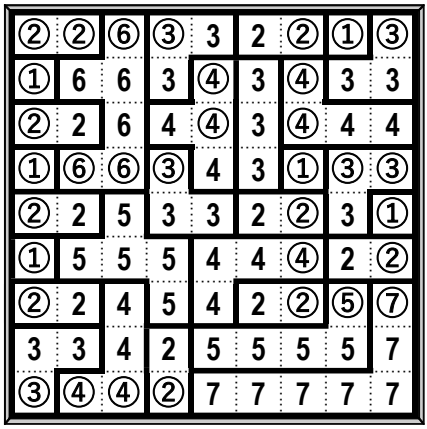

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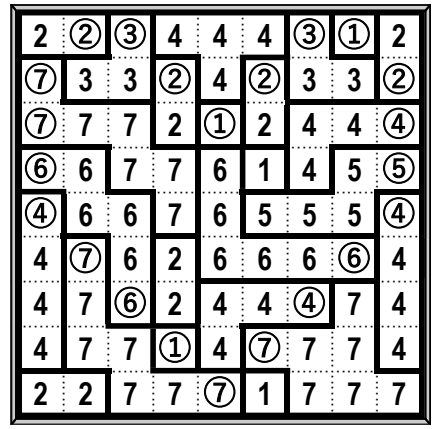

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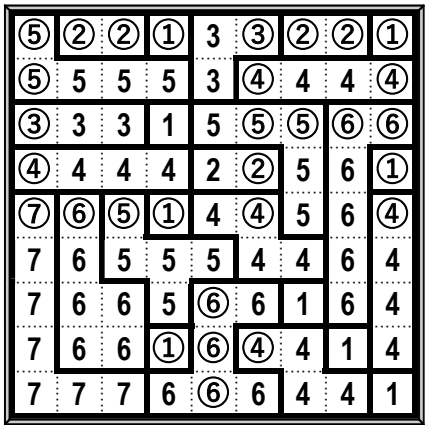

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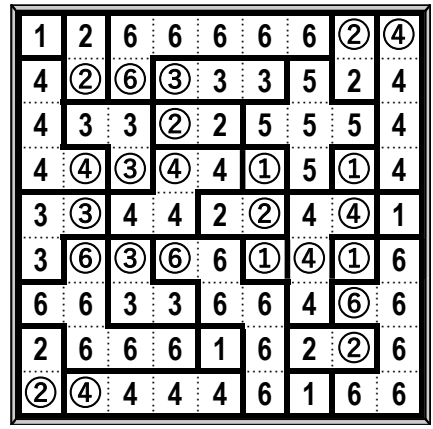

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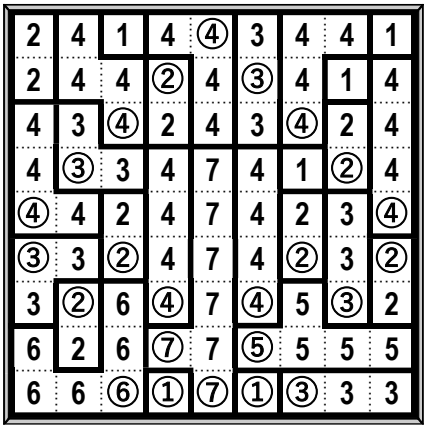

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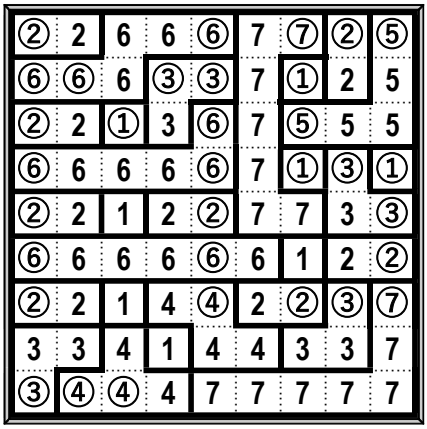

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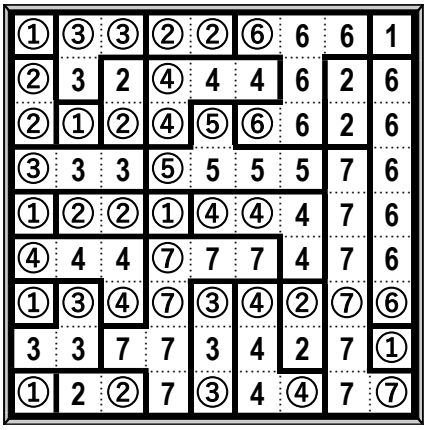

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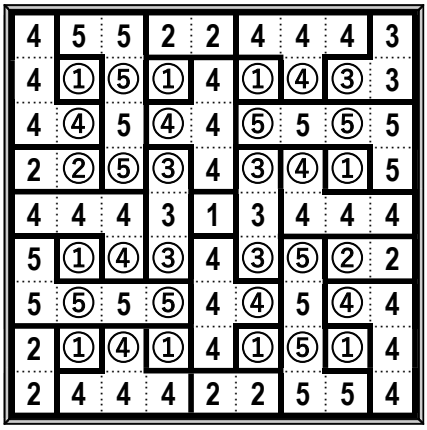

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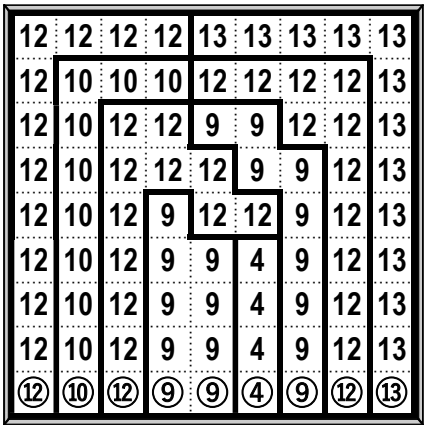

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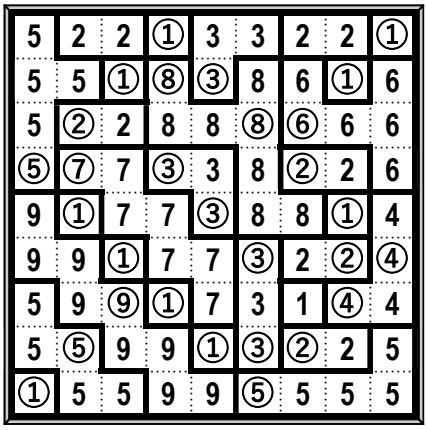

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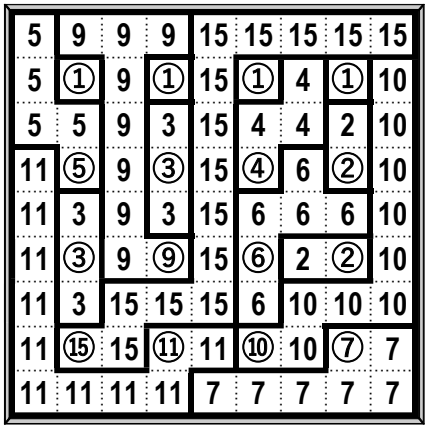

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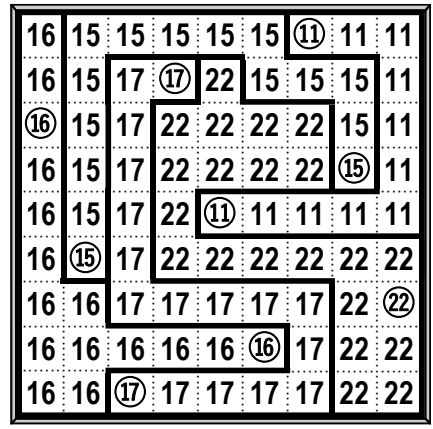

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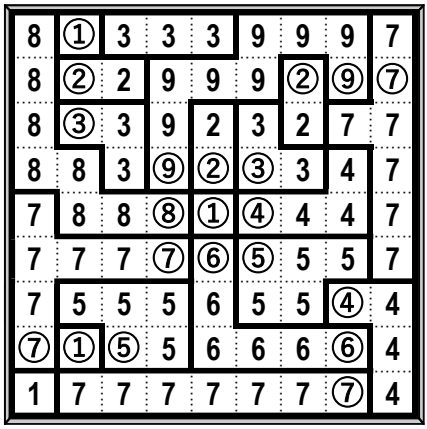

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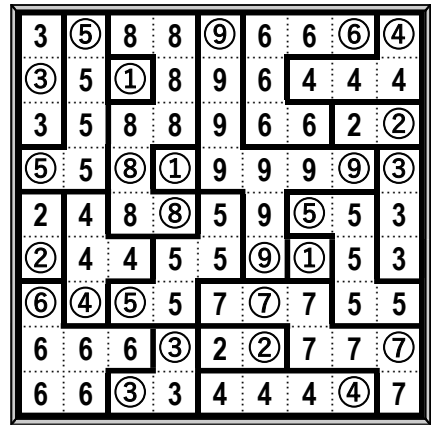

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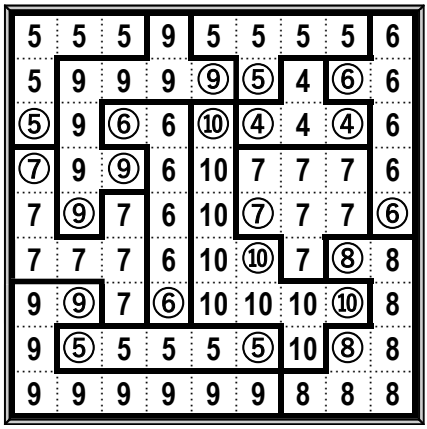

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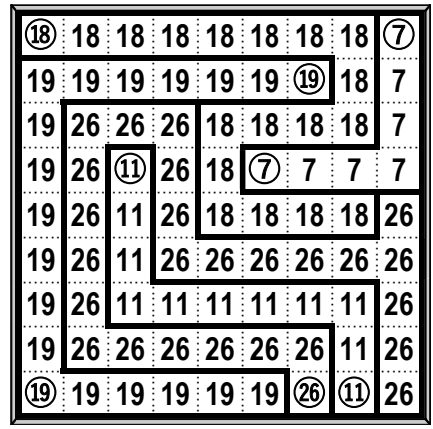

9 x 12 PUZZLES

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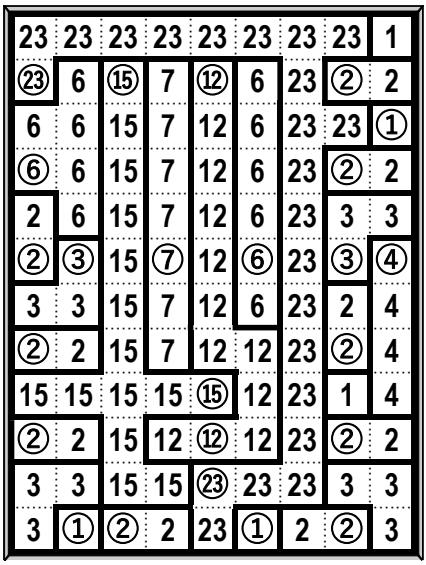

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6	6	15	7	12	6	23	23	①
⑥	6	15	7	12	6	23	②	2
2	6	15	7	12	6	23	3	3
②	③	15	⑦	12	⑥	23	③	④
3	3	15	7	12	6	23	2	4
②	2	15	7	12	12	23	②	4
15	15	15	15	⑮	12	23	1	4
②	2	15	12	⑫	12	23	②	2
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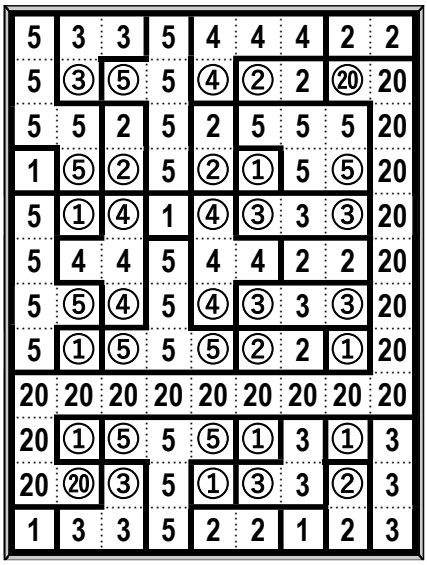
3	①	②	2	23	①	2	②	3

NO. 2



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5	5	2	5	2	5	5	5	20
1	⑤	②	5	②	①	5	⑤	20
5	①	④	1	④	③	3	③	20
5	4	4	5	4	4	2	2	20
5	⑤	④	5	④	③	3	③	20
5	①	⑤	5	⑤	②	2	①	20
20	20	20	20	20	20	20	20	20
20	①	⑤	5	⑤	①	3	①	3
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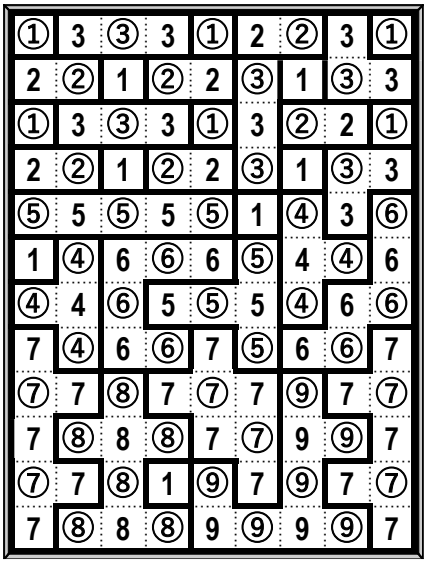
NO. 3



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2	②	1	②	2	③	1	③	3
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2	②	1	②	2	③	1	③	3
⑤	5	⑤	5	⑤	1	④	3	⑥
1	④	6	⑥	6	⑤	4	④	6
④	4	⑥	5	⑤	5	④	6	⑥
7	④	6	⑥	7	⑤	6	⑥	7
⑦	7	⑧	7	⑦	7	⑨	7	⑦
7	⑧	8	⑧	7	⑦	9	⑨	7
⑦	7	⑧	1	⑨	7	⑨	7	⑦
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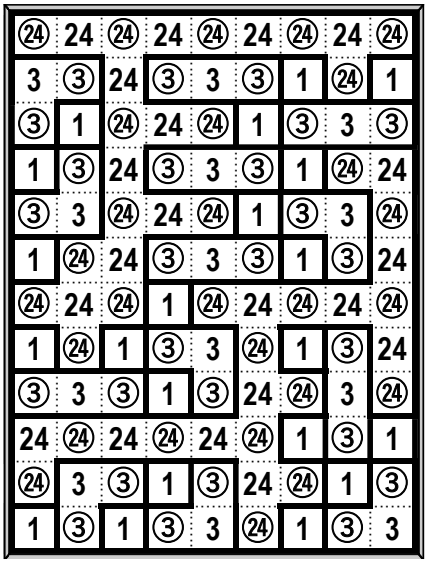
NO. 4



㉔	24	㉔	24	㉔	24	㉔	24	㉔
3	③	24	③	3	③	1	㉔	1
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1	③	24	③	3	③	1	㉔	24
③	3	㉔	24	㉔	1	③	3	㉔
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㉔	24	㉔	1	㉔	24	㉔	24	㉔
1	㉔	1	③	3	㉔	1	③	24
③	3	③	1	③	24	㉔	3	㉔
24	㉔	24	㉔	24	㉔	1	③	1
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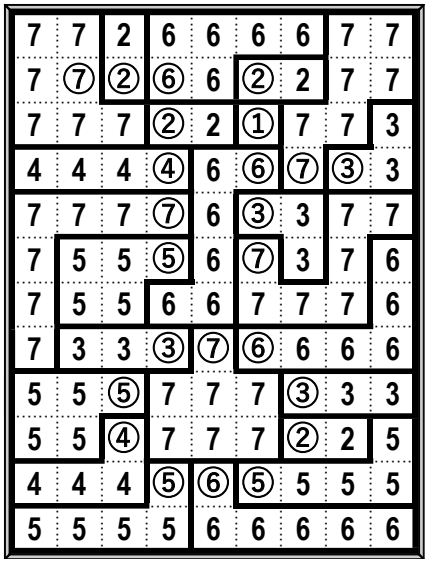
NO. 5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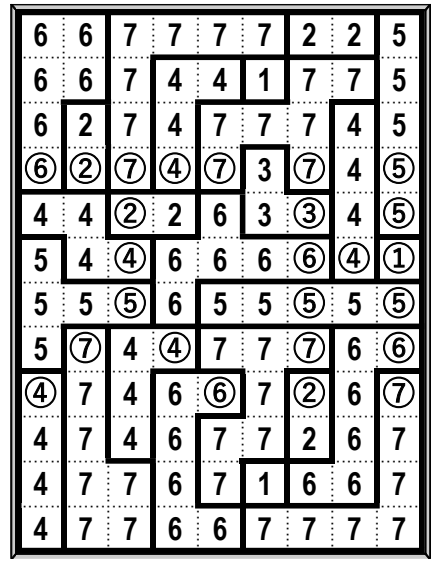
7 ⑦ ② ⑥ 6 ② 2 7 7
7 7 7 ② 2 ① 7 7 3
4 4 4 ④ 6 ⑥ ⑦ ③ 3
7 7 7 ⑦ 6 ③ 3 7 7
7 5 5 ⑤ 6 ⑦ 3 7 6
7 5 5 6 6 7 7 7 6
7 3 3 ③ ⑦ ⑥ 6 6 6
5 5 ⑤ 7 7 7 ③ 3 3
5 5 ④ 7 7 7 ② 2 5
4 4 4 ⑤ ⑥ ⑤ 5 5 5
5 5 5 5 6 6 6 6 6

NO. 6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6 6 7 4 4 1 7 7 5
6 2 7 4 7 7 7 4 5
⑥ ② ⑦ ④ ⑦ 3 ⑦ 4 ⑤
4 4 ② 2 6 3 ③ 4 ⑤
5 4 ④ 6 6 6 ⑥ ④ ①
5 5 ⑤ 6 5 5 ⑤ 5 ⑤
5 ⑦ 4 ④ 7 7 ⑦ 6 ⑥
④ 7 4 6 ⑥ 7 ② 6 ⑦
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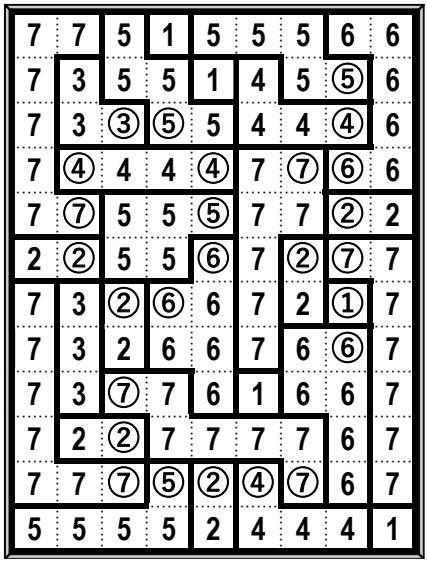
4 7 7 6 7 1 6 6 7
4 7 7 6 6 7 7 7 7

NO. 7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7 3 5 5 1 4 5 ⑤ 6
7 3 ③ ⑤ 5 4 4 ④ 6
7 ④ 4 4 ④ 7 ⑦ ⑥ 6
7 ⑦ 5 5 ⑤ 7 7 ② 2
2 ② 5 5 ⑥ 7 ② ⑦ 7
7 3 ② ⑥ 6 7 2 ① 7
7 3 2 6 6 7 6 ⑥ 7
7 3 ⑦ 7 6 1 6 6 7
7 2 ② 7 7 7 7 6 7
7 7 ⑦ ⑤ ② ④ ⑦ 6 7
5 5 5 5 2 4 4 4 1